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COMPUTERWORLD

Banyan to push more open Vines

Ambitious plans aim to counter similar Novell tack

By Elisabeth Horwitt

Banyan Systems, Inc. will deliver throughout 1994 on last year's promises to make its Vines network operating system and service platforms more open and scalable as well as easier to use and administer, a company executive said last week.

Meeting these commitments is crucial if Banyan is to keep a technological jump or two ahead of archrival Novell, Inc. The network operating system giant's 1994 plans include enhancements to its NetWare Directory Services to bring them more on par with Banyan's StreetTalk global directory and a port of NetWare to RISC-based Unix platforms [CW, Dec. 6 and Dec. 27].

Smoother for users

Banyan's 1994 deliveries will include porting Vines to different Unix platforms, offering graphical user interfaces for its Vines administration tools and providing more consistency across various Vines platforms in the way users initiate basic services such as log-on and messaging, according to Bill Johnson, Banyan's vice president of corporate business development.

For example, starting this quarter, Banyan will start shipping promised implementations on Hewlett-Packard Co., IBM and Sun Microsys-

Banyan, *page 15*

Intel confronts RISC

Pentium price drop to $2,500 by year's end could keep chip rivals at bay

By Michael Fitzgerald and Ed Scannell

Intel Corp. last week outlined an aggressive product and pricing push for 1994 that includes a new processor and much lower prices on Pentium systems by year's end. This push means significantly faster PCs at current price points, challenging RISC PC vendors and perhaps encouraging a move to Microsoft Corp.'s Chicago as well as to Pentium itself.

What a difference a year makes

Intel predicts that by year's end the price/performance structure for PCs will shift dramatically

Mid 1993	Price*	Second half 1994
	$3,500	
Intel 486DX/33	$2,000	Intel DX4 processor
	$4,500	

*Base configuration system price

A new chip, the Intel DX4, will appear widely in systems starting in March, according to sources. Hans Geyer, vice president of Intel's microprocessor products group, refused to confirm a specific time for DX4 delivery.

Geyer said the DX4 is part of a broad strategy that will see today's high-end 1486DX2-based systems drop from $2,500 to less than $1,500 in the second half of 1994, with Pentium desktop systems falling into the $2,500 price range (see chart).

Boost for 32-bit Windows

The greatly accelerated price drops are an obvious effort to slam RISC PC makers and damage Intel cloners Advanced Micro Devices, Inc. and Cyrix Corp. Also corporate users could experience a more rapid exploitation of Microsoft's Chicago operating system and 32-bit applications.

"If you want to do all the things that Chicago will allow you to do, you need this," said Joanne Walter, NCR Corp.'s director of marketing. "As a systems vendor we want to bring those price points down for Pentium and for DX266."

The software could also bolster Pentium's position, particularly against RISC-based systems.

"It's certainly part of Intel's agenda to make sure that the

Intel, *page 12*

32-bit operating systems

Cold wind blows thru Chicago

By Stuart J. Johnston and Ed Scannell

■Just weeks after Microsoft Corp.'s big push to jump-start Windows 4.0 applications development, many analysts already see cracks in the company's plans. They predict everything from late delivery of important 32-bit applications to a schedule slide for the system.

If Microsoft's schedule slips past the end of 1994 and major developers ship their applications 90 days after that, it could be the spring or summer of 1995 before users start to feel the true impact of Chicago. That is about the same timetable scheduled for Microsoft's first major upgrade of Windows NT, which is code-named Cairo.

Chicago may require more memory than expected. A jump to 6M bytes may create some initial resistance among users with 4M-byte boxes, but it would have little effect on buyers of new machines.

These predictions are based in part on Microsoft's past delivery record, the learning curve required to develop for a new graphical user interface, the lack of 32-bit development tools for Windows 4.0 and briefings from Microsoft.

For example, while Microsoft officials have said that many commercial developers are expected to join the company on stage for the official rollout, they concede that a number will probably ship their applications 30 to 90 days after Chicago's shipment.

"They'll want to test [their applications] with the final code, [which they'll receive] probably 30 days before we launch," said Doug Henrich, director of Microsoft's devel-

Chicago, *page 10*

IS eyes centralized fax savings

By Lynda Radosevich

Pepsi-Cola Co. this week will begin piloting a LAN-based enterprise fax system from Alcom Corp. in Mountain View, Calif. Its goal is to provide a central service that lets all the company's end users send and receive fax documents from within their applications.

Pepsi is part of a small but growing movement by large organizations to centralize fax services to control burgeoning telephone-line charges, monitor fax traffic and save employees time and energy.

"Companies have fancy networks carrying data, maybe even voice. But the fax machines are still using dial-up. So the telecommunications managers are saying, 'Why not bring fax into private networks?'" said Mark Winther, a vice president at Link Resources Corp. in New York.

One of those managers is Alex Victor, a technologist at Visa International's VisaNet architecture and technology products division in San Mateo, Calif. The Visa unit is looking to add enterprise fax services from OAZ Communica-

Fax savings, *page 14*

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THE MAC TURNS 10

A decade after the Mac's debut, things haven't turned out exactly as the development crew had planned. "The most poignant thing about the way things worked out is that Windows, with its inferior copy of the Macintosh, has captured at least six times as many users," says software whiz Andy Hertzfeld. *See In Depth, page 81.*

Q&A **WHAT GOOD IS PLUMBING IF THE WATER IS FOUL?** While IS fiddles with technology, companies are starving for lack of good information, says Ernst & Young's Tom Davenport. It's time for some serious reevaluation. *See Management, page 69.*

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Table of Contents

January 10, 1994

MANAGEMENT

■ IS professionals must learn to think and act less like architects and more like ecologists and behavioral scientists, says **Tom Davenport at Ernst & Young**. *Page 69*

■ **Marketing the IS department: Amoco** finds that making IS bid against outsourcers is a great attitude adjuster. *Page 77*

NEWS

■ **Beta users like Microsoft's Excel 5.0**, but a spreadsheet is still not a suite. *Page 4*

■ **HP** drops the shoe and buys into **Taligent**. *Page 4*

■ **Novell** will release **UnixWare 2.0** next summer, jumping into the Intel SMP Unix market. *Page 6*

■ **Silicon Graphics** unwraps new, faster models of its 6-month-old **Indy workstations**. *Page 6*

■ **Digital** will provide **product specifics for its software frameworks** strategy next month. *Page 7*

■ **MCI** challenges local telcos on their turf with plans to install fiber nets in 20 cities. *Page 8*

■ **Apple** reveals its long-range plans for **PowerPC**. *Page 12*

■ **General Magic** releases an operating system and a **superhighway navigator**. *Page 12*

■ **Minolta**, hit with a six-figure surcharge by a software vendor during outsourcing, alleges sour grapes. *Page 14*

■ **RISC-ready AS/400s**, due this spring, will require swapouts of existing machines. *Page 16*

■ **Co-authors** part ways as **Mike Hammer** and **CSC Index** dissolve their relationship. *Page 16*

■ **Borland** and **Microsoft** gear for battle in client/server upsizing. *Page 20*

DESKTOP COMPUTING

■ **InterGroup Technologies** offers independent software vendors an alternative to developing knockoffs of Visual Basic Applications Edition. *Page 35*

WORKGROUP COMPUTING

■ **ForeFront Group** challenges **Lotus** in the groupware arena with real-time capabilities. *Page 41*

ENTERPRISE NETWORKING

■ **The University of Michigan** plunges ahead with a **DCE- and X.500-based client/server installation**, despite a lack of vendor support for those standards. *Page 51*

LARGE SYSTEMS

■ Three companies find three different routes to **object databases**. *Page 57*

APPLICATION DEVELOPMENT

■ Apple feeds an initial release of its **OpenDoc** compound document architecture to selected developers. *Page 63*

Document

Open Standard

IN DEPTH

■ The Mac turns 10! *Computerworld* gathers eight of its **developers** to reminisce and swap **visions of the next great leap**. *Page 81*

■ Plus: A glimpse into the early days of the Mac in an **exclusive excerpt** from a new book by Steven Levy, author of *Hackers*. *Page 82*

CAREERS

■ **The transition from NetWare 3.x to 4.x** begins with getting rid of the file server-centric mind-set. *Page 87*

■ **Listen up, you LAN types.** Mainframers can still teach you a thing or two. *Page 89*

MARKETPLACE

■ Get the **cost of on-line services** under control: Negotiate a flat rate. *Page 97*

COMPUTER INDUSTRY

■ Symantec's purchase of **Rapid Enterprises** is part of a larger push to diversify. *Page 30*

COMMENTARY

■ Common scripting languages are likely to be the next battleground for PC application vendors, **Charles Babcock** writes. *Page 6*

■ Industry notables pay homage to **Thomas Watson Jr.** *Page 32*

■ In networked organizations, **data protection** can easily become the tool of **power politics**. **Michael Schrage** warns. *Page 33*

Company Index ..... *Page 104*

Editorial/Letters to the editor ..... *Page 32*

Friday Stock Ticker ..... *Page 105*

Executive Briefing

Speed's the thing. Quick delivery is at the top of IS managers' resolution lists for 1994, whether they're talking about **faster application development** or better **tools to help end users** reach needed information more quickly. *Page 62*. Given that fact, it's not surprising that **real-time capability** is becoming a bigger issue in the **groupware** arena. *Page 41*

Whittling connection costs. An increasing number of companies are moving to **centralize fax services** and integrate them with enterprise networks. One big incentive: reduced phone-line charges. Centralized traffic is easier to monitor and track. And some organizations plan to consolidate fax traffic from multiple dial-up lines to run over private T1 lines or public dial-up lines during reduced-cost hours. *Page 1*. MCI's move to step into the local access arena with **fiber-optic local links** may also yield some savings for corporate users. Optimistic estimates of the eventual discount the company might offer run as high as 30%, although MCI isn't committing itself to a figure. *Page 8*

"What amazing about the last 10 years is not how far we've progressed, but how far we've regressed."

CHRIS ESPINOSA

SEE PAGE 81

On-line services are proliferating as simplified communications front ends accelerate the wiring of corporate America. **Coopers & Lybrand's electronic tax information service** for CFOs and corporate tax directors, launched last May, now boasts 450 Fortune 500 subscribers and generates hundreds of thousands of dollars in new revenue. And an **electronic forum for lawyers** at top law firms and major corporations has signed up 3,000 users since last spring. *Page 52*. If your company is interested in signing on for some of the many offerings out there and plans on heavy use, be sure to ask about **flat-rate options**. They aren't always advertised, but many providers will negotiate. *Page 97*

Beyond first class. Want to know what the brave new world really looks like? Take a flight through Denver on or after March 9. That's when the city's new $3.1 billion **Denver International Airport** will open its gates and rev up its state-of-the-art, fiber-optic network. So advanced are the facilities that United Airlines upgraded its own systems just to take advantage of them. Tourist tip: Check out the gate agent workstations, which will give agents a video view of the jetways for more accurate monitoring of flight traffic and staffing. *Page 26*

HOW TO CONTACT COMPUTERWORLD EDITORIAL:

	PHONE:	FAX:
Main office, Framingham, Mass.	(508) 879-0700	(508) 875-8931
24-hour tip line	(508) 820-8555	
Mid-Atlantic bureau, Rochelle Park, N.J.	(201) 587-0090	(201) 712-1808
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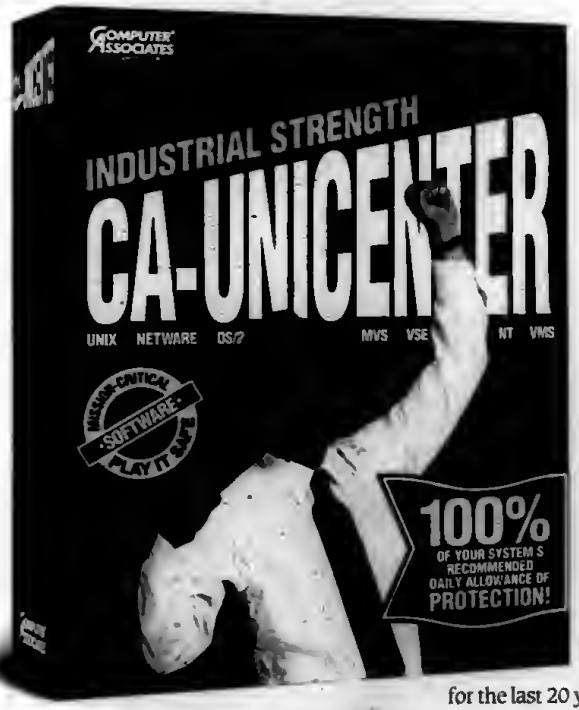

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HP bets on Taligent

Cash infusion, technology exchange may aid object-oriented developer

By Melinda-Carol Ballou

■ Hewlett-Packard Co.'s disclosure last week that it will purchase a 15% stake in Taligent, Inc. and use the latter's object-oriented development environment with its Unix operating system could help boost the IBM/Apple Computer, Inc. joint venture's prospects in the emerging object wars.

"From the user's point of view, they don't know what Taligent is going to look like, but every partner [Taligent] can add gives them credibility," said Brent Williams, an analyst at International Data Corp., a consulting firm with offices in Mountain View, Calif.

Even with HP, Taligent has its work cut out. The company faces opposition from Sun Microsystems, Inc., which recently announced an alliance with Next Computer, Inc. [CW, Nov. 29]; and from Novell, Inc. with its AppWare environment; and Microsoft Corp. with its Microsoft Foundation Classes (MFC), distributed Object Linking and Embedding (OLE) and Cairo.

Taligent officials claim that its Application Frameworks, which will begin shipping in stages during the first half of 1994, will enable developers to more easily create, reuse and maintain code [CW, Nov. 8]. For instance, while MFC offers class libraries to ease Windows development and OLE offers interfaces to enable developers to share data, OLE is arcane and difficult to use, many developers said.

"We have over 100 frameworks, each with its own class libraries, and because of their comprehensive design, a developer will get the functionality of other frameworks — such as real-time, [two- or three-dimensional] graphics, compound documents or international text and line layout — without having

Taligent CEO Joe Guglielmi *claims Taligent will offer developer flexibility*

to create it separately," said Scratton Selavos, vice president of marketing and sales at Taligent.

Using Taligent, developers will also be able to "write an application once, and it will be able to run across multiple operating systems from Intel to RISC to PowerPC," said Joe Guglielmi, Taligent chairman and chief executive officer.

But talk is cheap. Taligent's technology is not commercially available yet, and MFC and OLE are already well-established in the market, with about 135 independent software vendors committed to shipping OLE-compliant products by June.

Aiming at Windows

Other analysts said that given Microsoft's ubiquity, Taligent must come up with an effective way to target Windows. Taligent officials said they will do just that and that they expect to support Microsoft's 32-bit operating systems, such as Cairo and Chicago, when they ship, as well as Windows clients.

HP's infusion of cash will be helpful but more significant, according to industry analysts, will be a technology exchange between the companies. Taligent will license HP's Distributed Object Management Facility (DOMF) and components of HP's Distributed Computing Environment/9000.

HP and IBM last year announced a deal to integrate DOMF with IBM's System Object Model (SOM) and distributed SOM. Taligent will incorporate both. Taligent will also standardize application programming interfaces (API) for its Application Frameworks and establish a licensing and certification program with X/Open Co. to make the APIs available to third parties.

Under terms of the HP agreement, which had been expected [CW, Aug. 16], Taligent will issue new shares of its stock to HP. Financial terms were not disclosed. HP will also take a seat on Taligent's board of directors.

West Coast bureau chief Jean S. Bozman contributed to this story.

Sun seeks luck o' the Irish (vendor)

Continuing its reliance upon third parties to fill in technology gaps, Sun Microsystems, Inc. will this week announce a minority investment in Iona Technologies Ltd., according to industry sources.

Iona, a Dublin-based software vendor, has developed an object request broker that complies with the Object Management Group's (OMG) Common Object Request Broker Architecture (CORBA). Orbix, which is available on Sun's Solaris and Microsoft Corp.'s Windows NT operating systems, will be available on Windows 3.1 during the first quarter of this year.

Windows support may have been a key factor in Sun's investment. Sources said Sun will use Iona's technology to strengthen and extend the range of its own CORBA-compliant Project Distributed Object Environment (DOE).

Currently shipping in early release form, Project DOE has been late to the market. Sun announced late last year that it will license technology from Next Computer, Inc. for use as an object-based development environment and is expected to announce more details about the relationship this week.

Sun's equity investment in Iona is expected to be about 20%. Sun is also expected to gain a seat on Iona's board, sources said.

Sun officials could not be reached by press time, and Iona officials refused comment. —*Melinda-Carol Ballou*

Microsoft takes suite step with Excel 5.0

By Michael Vizard

Microsoft Corp.'s delivery of its Excel 5.0 spreadsheet is being heralded by beta users as one of the most stable upgrades the company has ever produced. But that spot of good news is not enough by itself to start an immediate deployment of the next generation of Microsoft's office applications suite.

In fact, Microsoft still has a number of hurdles to leap before it completely delivers on the promise of its Office 4.0 suite, which was announced last fall. It needs to deliver both PowerPoint 4.0, due later this month, and an update to an allegedly buggy Word 6.0.

Meanwhile, the lack of a full and stable suite will hamper efforts to position Office 4.0 support for the Object Linking and Embedding (OLE) 2.0 interface as a counter to the momentum Lotus Development Corp. is building around SmartSuite and Notes [CW, Dec. 6].

Second piece of pie

In the suite arena, Excel 5.0 is the second major element of Office 4.0 after Word 6.0. Both applications are the first major software packages to take advantage of the integration capabilities inherent in OLE 2.0, which effectively melds disparate applications into a single entity.

The survey says...

THE TOP 10 WORLDWIDE PC APPLICATIONS*

Application	Revenue (in millions)	Units shipped (in millions)
Microsoft Office for Windows	$493	1.6
Microsoft Word for Windows	$407	2.8
*WordPerfect for Windows	$390	2.9
*Microsoft Excel for Windows	$292	2.1
Lotus 1-2-3 for DOS	$257	1.4
*Lotus 1-2-3 for Windows	$207	1.2
WordPerfect for DOS	$204	1.9
*Microsoft Office Professional for Windows	$177	0.5
Lotus Notes	$149	0.6
Borland dBase IV	$117	0.7

*Individual application numbers do not include sales with suites

Source: Dataquest, Inc., San Jose, Calif

Suites now account for more than 50% of the software units Microsoft sells.

"Pretty soon the world is going to figure out that Microsoft is not delivering its suite. Lotus already has a stable suite and Notes, so they will continue to whittle away market share in the Windows space," said Daniel Gasteiger, a partner at Gasteiger & Delonas, a consulting firm in Cambridge, Mass.

For example, Lotus last week announced that Coopers & Lybrand has signed a contract to equip 28,000 PCs in 15 international offices with SmartSuite and Notes. Long term, Coopers & Lybrand, which already has more than 25,000 units of Notes, is expected to increase its SmartSuite and Notes commitment to 40,000 units worldwide.

But in the standalone spreadsheet arena, Excel 5.0 will help Microsoft defend its lead in Windows spreadsheets from Lotus and Borland International, Inc., both of which have substantially improved their offerings in the last six months.

Highlights in Excel 5.0 include much better use of color to highlight icons, the ability to use a cursor to get an explanation of what an icon represents, Pivot Tables for rearranging spreadsheet data on the fly and the ability of average users to exploit Wizards.

Initial units of Excel will be used to fill some half-million units on back order. General availability is scheduled for the end of this month.

Getting good reviews

So far, feedback on Excel 5.0 is very positive. "This is the most stable beta we've ever seen from Microsoft. We hope it's a foreshadowing of the quality we can expect to see out of Microsoft from now on," said Joanne Witt, senior technology analyst at Siemens Medical Systems, Inc. in Island, N.J.

But while Witt said she is comfortable releasing Excel 5.0 to users at Siemens, she has yet to approve Word 6.0 for general release. In fact, she said it still has too many bugs to be released to the general user community.

As a Office site, she is waiting for an update to Word, due this quarter, before releasing the latest version of Word to her users.

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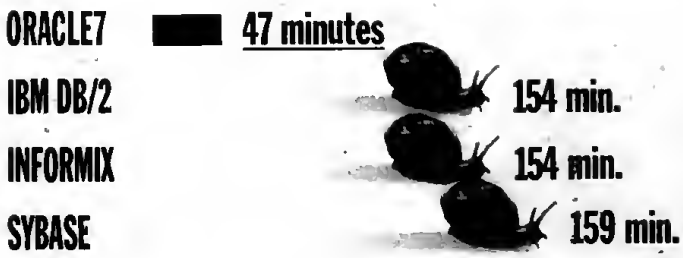

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Common language race is on

There's a new competitive front emerging in PC applications. Vendors such as Borland, Microsoft and Lotus are scrambling to supply developers and skilled end users with Englishlike common scripting languages, which are easy to use and cut across application suites.

The first supplier to implement a common language and give it object handling and multiple operating system capability will likely up the ante in PC application competition.

Up till now, most power users customized their report writing or executed routine command sequences by writing a macro. A common scripting language extends this capability across a vendor's application suite rather than forcing a user to learn a variety of macro statements.

But there are likely to be different degrees of vendor commitment. Microsoft officials said in June that they wanted to make Visual Basic their scripting language, and Visual Basic is included in Excel 5.0. But so far, Microsoft has hedged on whether it will license the most development-worthy version, Visual Basic for Applications.

Dee Dee Walsh, Visual Basic product manager in Redmond, Wash., suggests this is not likely in the next 18 months. "We're just too overwhelmed to consider licensing Visual Basic for Applications to other parties," she says. "We're not closed to it, but with our current work load [shipping Visual Basic], we can't handle it."

The need to learn multiple macro statements will disappear as software vendors vie to provide common scripting languages.

Charles Babcock

If Microsoft did so, it is conceivable that competitors or even customers would produce auxiliary applications. It's hard to view such a development as unfavorable, even to Microsoft, given the vitality that would surround its product line, but so far Redmond officials are making no promises.

Lotus committed itself to providing a common scripting language in its applications in September and has made LotusScript a part of Improv. LotusScript will find its way into other applications as new versions come out in 1994, says John Landry, senior vice president for development.

The notion of a common scripting language isn't new. Apple did something of this kind when it created AppleScript, where the commands GET and DELETE mean the same thing to all Macintosh applications. And there's even a precedent in the mainframe sphere — the Millenium accounting applications developed by the former McCormack & Dodge in Natick, Mass. When that company rearchitected its accounting series so modules could share data, the event triggered the use of the phrase "seamless integration."

A common scripting language will make it easier for PC application suites to work together in ways not foreseen in the Millenium example, says Landry, who architected that earlier innovation. Millenium was a fourth-generation language (4GL) unique to McCormack & Dodge, while LotusScript is similar to standard Basic.

Unlike a 4GL, which is database-oriented, a scripting language must be able to both create and access objects from the existing application suite. The charting engine in Improv, for example, can be called as an object by LotusScript to function in another Lotus application or even an application written by the user.

Lotus customers who use Notes may one day find they have an advantage in scripting languages, given Notes' ability to store and share objects across a group. Visual Basic users will be able to access objects, but they will be restricted to the conventions of Object Linking and Embedding 2.0.

The other major requirement for a scripting language is that it work with existing macro languages and be backwardly compatible with them. All three vendors can likely do this. Ideally, a scripting language would work with OS/2 as well as with Windows. So far, only Lotus is committed to this goal.

Babcock is *Computerworld*'s technical editor. His MCI Mail address is 575-2737

Next UnixWare on tap

By Jean S. Bozman
SAN JOSE, CALIF.

Novell, Inc. is planning a summer release of UnixWare 2.0, which will offer tighter integration with NetWare, along with support for symmetrical multiprocessing (SMP).

In the UnixWare 2.0 release, Novell is also expected to upgrade the level of NetWare integration that will ship this month with UnixWare 1.1 [CW, Dec. 20], noted Chief Technology Officer Kanwal Rekhi. From the start, UnixWare 2.0 will be a NetWare client, letting users access NetWare files.

UnixWare 2.0 will host system administration features such as software distribution and backup/restore tasks, said Biff Traber, director of UnixWare product marketing at Novell's Unix Systems Group in Summit, N.J. Like competitor The Santa Cruz Operation (SCO), Novell will offer UnixWare 2.0 software through resellers, allowing end users to install machine-specific SMP code with on-screen installation prompts, Traber said.

Over the rainbow

UnixWare has a long way to go to catch up to other Unix environments

Vendor	Product	Units shipped in 1993*
Novell	UnixWare 1.0	35,000
The Santa Cruz Operation	SCO Unix Server, Open Desktop	153,000
SunSoft	Solaris 1.X and 2.X	260,000

*Worldwide estimates

Source: International Data Corp., Framingham, Mass. CW Chart: Dave Marshall

Layered approach

To get the job done, Novell created a "generic" software layer that all the SMP hardware vendors can support. The layer runs under the UnixWare 2.0 operating system, Traber said. That is exactly what SCO did with its MPX 3.0 SMP software, analysts said, noting that few standards have emerged to simplify designs for SMP buses and I/O subsystems.

UnixWare 2.0's SMP support was delayed following Unix System Laboratories, Inc.'s (USL) decision to devote more resources to the desktop version of UnixWare 1.0, said Paul McGuckin, a Unix analyst at Gartner Group, Inc. in Santa Clara, Calif. After Novell bought USL last year, developers had to repair UnixWare 1.0 performance bugs, analysts and early UnixWare users said.

"It's at least a year late," said Brian Anderson, director of information systems at Trans Ocean Containers in San Bruno, Calif., who has tested UnixWare 1.0 since early 1993. "Neither USL nor Novell could accomplish the multiprocessing piece by themselves, and it remains to be seen if they can do it by August."

UnixWare 2.0 will run on a variety of SMP platforms based on Intel Corp. technology. Although Novell stopped short of identifying these platforms, the firm said it is working closely with Compaq Computer Corp.

Analysts expect Novell to compete with SCO's current SMP support for computers from Compaq, Wyse Technology, Inc. and AST Research, Inc., all of which run SCO's MPX 3.0 release.

Some users said they are more interested in UnixWare's evolving NetWare integration than in SMP support. At River Downs, a Cincinnati racetrack, a NetWare server and UnixWare 1.0 server sit side by side supporting 60 users. "It's a little network-sensitive, so I don't want to change things" by adding SMP, said Bob Hull, computer systems manager, who runs business applications under UnixWare 1.0.

At the University of Texas' M. D. Anderson Cancer Center in Houston, one UnixWare 1.0 server hosts a Unify Corp. relational database for 70 users. Network analyst Charles Tilbury said the site, which has 100 NetWare file servers, is looking for enhanced NetWare connectivity and more support for PC devices in UnixWare 2.0, rather than SMP support. "I want users to access their network without caring whether they are accessing Unix or NetWare files," he said.

Workstations

SGI beats HP to punch with Indy

By Jean S. Bozman
MOUNTAIN VIEW, CALIF.

Silicon Graphics, Inc. (SGI) last week revealed souped-up versions of its six-month-old Indy workstation family, making its move just two weeks before rival Hewlett-Packard Co. is expected to announce its own low-end entries [CW, Dec. 20].

Available in March, the new Indys were designed around 150-MHz MIPS R4400 chips that reportedly boost performance by at least 50%. The systems come with up to 64M bytes of memory and up to 1G byte of disk and are priced at $15,495 [CW, Dec. 27, 1993/Jan. 3, 1994].

The enhanced Indys fill out a low-cost line started in July with a $4,995 diskless model that hosts multimedia applications. There are now eight versions ranging in cost from $5,995 to $22,995.

Analysts also said the Indy machines are the first in a wave of low-end units expected from several vendors by March. "The [vendors] are targeting the low end of the workstation business, which overlaps with the high end of the PC business, to gain more [sales] volume," said Dominic Ricchetti, who directs workstation research at Dataquest, Inc. in San Jose, Calif.

At least one early Indy user was pleased with the R4400 addition, although upgrade kits will not be available for about six months, SGI said. Osteonics Corp. in Allendale, N.J., recently purchased 28 Indy workstations to handle three-dimensional design and manufacture of medical implants, such as hip replacements. As packaged with computer-aided design software, Osteonics' SGI systems were priced in the midrange of all workstation systems evaluated, said Brian Hutchison, the firm's vice president of finance.

Digital software frameworks crystallize

By Craig Stedman

Digital Equipment Corp. is expected next month to provide more concrete product information for the six software frameworks it is developing as part of its emerging client/server strategy. Included will be plans for incorporating object technology into all of the frameworks, industry sources said.

Digital is briefing analysts on the plans this week and will unveil them to customers on Feb. 8, the sources indicated. The fleshing out of the frameworks concept is viewed as the key part of the announcement, which will also feature new low-end workstations and a variety of layered software.

The frameworks were set up last summer to tie together third-party and custom applications in client/server environments. According to industry sources, they will support the Common Object Model (COM) specification Digital is developing with Microsoft Corp.

The COM specification, detailed in late November, will allow distributed applications written to Microsoft's Object Linking and Embedding (OLE) 2.0 interface to work with Digital's ObjectBroker software, an implementation of the Object Management Group's Common Object Request Broker Architecture.

In addition to the COM support, Digital is likely to build ObjectBroker into the frameworks to enable different applications to share objects, the sources said. The object capabilities are expected to be added throughout this year.

William Strecker, Digital's chief technology officer, said in late December that definition of the framework plans "will be completed in the next couple of months." Company officials declined to comment on the matter last week.

Lynn Berg, a Gartner Group, Inc. analyst in Stamford, Conn., who has criticized Digital for lacking a coherent software strategy, said the frameworks are beginning to take shape and "look like they have some substance behind them."

"Other vendors will be talking about [object technology], too, but Digital could very well get a jump on the rest of the industry if it can execute its strategy," she added.

Raymond Sasso, chief information officer at J. R. Simplot Co. in Boise, Idaho, noted that users "haven't seen anything behind the movie set thus far." But he said the frameworks are "a very appealing concept" and would be even more interesting with object capabilities.

However, Tim Bird, director of information services at Paws, Inc. in Muncie, Ind., said Digital needs to become "more steady on the software path" before the frameworks would interest him.

"Until Digital stays on something a long time, I'm not all that impressed," Bird said. "They've been too mercurial."

Frame of reference

Digital has identified six frameworks that will include system software, application programming interfaces, tools and methodologies:

- **Data integration:** Will provide transparent access to distributed data; built around Digital's Accessworks and DB integrator.
- **Enterprise messaging:** Integrated enterprisewide mail capabilities via Digital's X.400-compliant Mailworks backbone.
- **Production computing:** Transaction processing framework, with plans calling for support of multiple databases.
- **Workgroup computing:** Document management, work flow and mail integrated across workgroups through Digital's LinkWorks software.
- **Management:** Network management via IBM's NetView/6000; systems and software asset management also planned.
- **Technical computing:** Will integrate high-performance technical and scientific applications.

News Shorts

Apple, Microsoft collaborate

The AppleSoft Division of **Apple Computer, Inc.** and **Microsoft Corp.** have signed an agreement designed to ensure access between and interoperability of their messaging and directory services, along with support for Common Mail Calls programmatic calls on both platforms. The pact also seeks to provide customers with the software needed to share information across the two platforms, including a suite of Messaging Application Program Interface (MAPI) service providers and Apple Open Collaboration Environment-based gateways. Microsoft also agreed to support the AOCE in its key Macintosh applications.

Novell DOS, NetWare versions pending

A **Novell, Inc.** spokeswoman confirmed that it plans to announce this week end-user availability of Personal NetWare and Novell DOS 7.0. Users will be able to buy Personal NetWare immediately; Novell DOS should follow in about three weeks. Single-user versions of either package will cost $99, and a five-user version of Personal NetWare will cost $395, according to the spokeswoman (see related story page 24).

First Ohio Bancorp CIO leaves

William E. Eager has left **First Bancorporation of Ohio** to become chief information officer at **Community Mutual Insurance Co.** He will manage a 400-person staff and administer a $50 million information systems budget at the Cincinnati-based health insurance company. He was previously executive vice president at First Bancorporation. No successor has yet been named at the bank.

Amdahl, Fujitsu join development forces

Amdahl Corp. and **Fujitsu Ltd.** last week announced what many had already assumed: The two will jointly develop the companies' next generations of mainframes, due in 1996. Amdahl's version of the CMOS-based machine will be IBM-compatible, while Fujitsu's will run its proprietary operating system.

An offer they could not refuse

NCR Corp. announced that roughly 2,400 of its 5,500 U.S. employees have accepted an early retirement offer. The offer is part of a plan announced by NCR last October to eliminate 16% of its 51,000 worldwide jobs by March. Approximately 25,000 NCR employees are eligible for a voluntary separation package made available last week with a Jan. 31 application deadline. NCR officials said they may have to resort to layoffs if not enough employees opt out.

Bolt, Beranek taps ex-IBM exec

Networking vendor **Bolt, Beranek and Newman, Inc.** (BBN) has named former IBM marketing executive George Conrades as president and chief executive officer. Stephen Levy, who previously held those titles, remains chairman of the board. Conrades should shore up BBN's well-respected technology with some marketing know-how, observers said.

SHORT TAKES Continuing its push for users in commercial sites, **Sun Microsystems, Inc.** is expected to announce today that it is shipping the first 20-way SMP version of the SPARCcenter 2000.... **Digital Equipment Corp.** continued to tap into the ranks of IBM executives, naming Vicenzo Damiani corporate vice president and president of its Geneva-based European operations.... **OpenVision**, a vendor of Unix system management tools, has named Geoff Squire president and CEO of its international division. Squire was most recently head of **Oracle Corp.**'s overseas group.

More news shorts, *page 16*

Fiber-optic networks

MCI savings pitch piques users

By Ellis Booker

MCI Communications Corp.'s plan to build hundreds of local-loop, fiber-optic networks could save customers big bucks on their communications bills. But many of those users last week said they first need to hear the specifics of MCI's pricing schemes before switching their ways of accessing local and long-distance networks.

The $2 billion initiative — part of a $20 billion network upgrade scheduled to take place during the next six years — will be led by a wholly owned subsidiary called MCI Metro, the company disclosed last week.

Clearly, MCI's own long-distance operation will be a beneficiary of the bypass strategy because it will reduce the access fees it pays to local carriers to reach many of its big customers. MCI said it now pays 45 cents of every revenue dollar on these fees, or $5.5 billion of its $12 billion revenue.

But how much of these savings will be passed along to customers — many of whom already have dedicated lines into MCI's long-distance network that bypass the local exchange — has yet to be spelled out with pricing details.

"We can guarantee [our access rates] will be below the [Bell operating companies]," said an MCI spokesman. Recently, MCI chairman and Chief Executive Officer Bert C. Roberts called BOC fees "exorbitant by a factor of two."

Chris Rapseik, manager of corporate systems at Transammonia, Inc. in New York, said access through an MCI Metro fiber ring "would give us options we don't have now," but added that he would need at least a 25% savings to make the jump.

Transammonia, with an annual telecommunications budget of about $300,000, sends much of its voice and data traffic from its New York office over a leased T1 from Nynex Corp. into AT&T's long-distance network.

He said while he is happy with AT&T, the notion of using MCI as a one-stop shop "would be of interest, absolutely."

Robert Bloom, director of telecommunications at The NASDAQ Stock Market, Inc. in Trumbull, Conn., agrees that a savings of 25% would be needed before he would consider a change. "At 30% it would be a no-brainer," he said.

However, the arrival of MCI Metro will not impact NASDAQ's plans because late last year it announced a giant, six-year project with MCI to build a new, TCP/IP enterprise network. Dubbed the NASDAQ Enterprise-Wide-Network, it will be able to support 800 million trades per day, scalable to more than 1 billion trades per day.

Outside experts suggest a 30% savings is a reasonable mark. "I wouldn't be surprised to see a 30% savings," said Philip H. Enslow Jr., past president of the International Council for Computer Communications and a professor at the College of Computing at the Georgia Institute of Technology in Atlanta.

But MCI executives shied away from such expectations. "Customers are making the switch to competitive access providers when the savings are 10% to 15%," said MCI Senior Vice President Nate A. Davis, who will be MCI Metro's chief operating officer. "People are switching on that basis today."

Besides, he said, features of MCI's local Synchronous Optical Network (Sonet) fiber rings, such as high availability, will be a key selling point.

Finally, he said MCI hopes to bring some of its advanced products into the local loop.

MCI Metro has already completed the first of several fiber-optic rings in Atlanta and plans to build similar networks in another Top 19 U.S. markets. This year, MCI Metro will target Boston, Los Angeles, Washington and Dallas, according to MCI sources.

Additionally, MCI said it would press regulators to allow it to provide switched-access services. Only four states — Illinois, New York, Massachusetts and Washington — allow some limited competition for switched access services.

Sonet — soon

MCI also detailed last week its plans to complete the deployment of Sonet technology. The carrier said its domestic network will be Sonet-compliant by the end of this year; international routes across the Atlantic and Pacific oceans will be ready by 1995. The first U.S. customer for the domestic Sonet network will be the NSFnet/Internet, MCI announced.

Throwing down the gauntlet

As it did two decades ago when it helped force competition into the long-distance arena, MCI last week cast itself as a company that would bring competition to a closed market.

"In the absence of any competitive pressure," said Burt Roberts, MCI's chief executive officer, "the [Bell operating companies] have simply not lived up to their responsibility to provide the local-access capability that MCI and its customers need at a decent price."

Of course, this battle will not be like MCI's first time around. Competitive access providers such as MFS Communications Co. in Omaha and Teleport Communications Group in New York already offer fiber rings in many metropolitan zones.

"MCI Metro is just one more player driving its wagon into the LAN rush territory that's being taken away from the Bell operating companies," said Robert Rosenberg, president of Insight Research Corp. in Livingston, N.J.

It is also likely that MCI's aggressive move into the local loop will be used as fodder for Bell company calls to be permitted to engage in long-distance services.

But MCI officials harshly rejected this reciprocal logic, repeating their charge that the telephone companies continue to have an unfair advantage because of their ownership of the local "bottleneck."

— Ellis Booker

Corrections

Due to a reporting error, a story in the Dec. 6 issue incorrectly referred to World Software Corp. as a start-up company. The company has been in business for five years.

Due to a production error, the photographs of Peter Keen and Rich Malone were mistakenly identified in the Open Systems supplement in the Dec. 6 issue.

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Chicago

CONTINUED FROM PAGE 1

oper relations group. "I expect 50% [of the major] players will have their applications ready when we ship Chicago," he added.

Among the most vocal naysayers is Westport, Conn., research firm Meta Group, Inc. It predicted in a December report that Microsoft will not achieve volume shipments of Windows 4.0 until the first quarter of 1995 vs. sometime in 1994.

"It boggles my mind that so many people trust them on this when they've been burned so many times before," said Matt Cain, program director of workgroup computing strategies at Meta Group, pointing to previous schedule slides for Windows 3.0, 3.1 and Windows NT.

Even if Microsoft does meet its year-end ship date, many analysts and developers still predict a lag between user availability of Windows 4.0 and Chicago-specific applications — true 32-bit multitasking, multithreading applications — from vendors other than Microsoft.

Applications lag

The issue is important when you consider it in light of the fate of other operating systems that suffered a considerable lag between their launch and the arrival of Chicago-specific applications.

Third-party developers "tell us it will be a lot like Windows 3.0, where they will have applications right after the Chicago announcement or shortly after. But if they do not have 32-bit Windows applications available, it will obviously slow down the acceptance rate of Chicago," said Brian Moura, assistant city manager for the city of San Carlos, Calif.

Agreeing that "developers can't make all their plans based on Microsoft's announcements," Lyle Griffin, vice president of advanced technology at Micrografx, Inc. in Richardson, Texas, said talk of Chicago applications coming out in the second half of 1995 is probably not far off. Even so, he said his company is well under way with development for Chicago.

"Our assumption, always has been [that Chicago will ship by] Fall/Comdex, which means you would not have major independent software vendor action until mid-1995 at the earliest," said Bill Bluestein, senior analyst at Forrester Research, Inc. in Cambridge, Mass.

This is attributed in part to the fact that development for Chicago's application programming interfaces is not trivial. Most major developers will take as long as six months after Chicago actually ships to deliver finished applications, analysts said.

Microsoft officials stated that they expect many applications will be ready when Chicago ships. Despite previous overoptimistic delivery expectations, they said they still believe they can meet their year-end shipping schedule.

"Developers should have less trouble doing 32-bit applications than [they did] two or three years ago because there are many more developers that have experience with the Windows programming model," one Microsoft spokesperson said.

'Nontrivial' pursuit?

Some developers remain unconvinced, partly because of their belief that the planned changes for the product's user interface alone give developers a steep learning curve.

"If this interface is radically different, the amount of added work for developers will be significantly more. We are expecting it to be nontrivial," said Richard Rahins, chairman at Alpha Software Corp. in Burlington, Mass.

In fact, because Chicago's new object-oriented user shell is not finished yet, Microsoft officials would not give a blanket promise that developers' programs will not need some rework in order to run, although they offered assurances that any rewriting would be minimal.

But analysts remain skeptical.

"Remember that [Windows 4.0's] GUI is not done, and that is about 75% of the application [code]," Bluestein said.

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PowerPC wary

Apple must provide upgrades and supply

By James Daly
SAN FRANCISCO

While Macintosh users are enthusiastic about the potential of the upcoming PowerPC-based models, they remain nervous about whether Apple Computer, Inc. can pull off the tricky transition with a minimum of problems.

In mid-March, Apple is expected to announce at least three new models based on the speedy PowerPC 601 chip, which is a collaborative effort of Apple, IBM and Motorola, Inc. The new machines are expected to range from a 60-MHz entry that sells for about $2,000 to an 80-MHz machine costing about $4,000.

A popular phrase bandied about at last week's MacWorld Expo was "investment protection," or the ability to run old applications on the new machines. No problem, said Entry Systems Group product manager Bruce Gee.

The new PowerPC chips will have a 68LC040 emulator running in their read-only memory, thus allowing old applications to run on the new system with a minimum of fuss, Gee said.

"That sounds great and it looks wonderful on paper, but until I see the rubber hit the road I'm going to be a bit of a skeptic," said Karl Kaste, manager of commercial operations at Geocentech, Inc. in South San Francisco. But Kaste still has high hopes for the PowerPC. For the past six months he has bought only the Macintosh models that Apple says will be upgradable to the PowerPC (see chart above).

Power up

APPLE SAYS IT WILL PROVIDE POWERPC LOGIC BOARD UPGRADES FOR THE FOLLOWING MACINTOSH MODELS:

IIVX, VI and Performa 600
Centris: 660AV, 650 and 610
Quadra: 840AV, 800, 660AV 650 and 610
Workgroup Server: 60, 80 and 95

Power increase: Two to four times the performance of existing Macintosh models when running native PowerPC applications

Availability: Officially, first half of 1994 but expected by April

Price: $700 to $2,000

Daystar Digital has also announced plans to provide upgrade cards for the Quadra 650, 700, 800, 900 and 950 and the Centris 650

Delivery concerns

Another concern was Apple's ability to deliver the new PowerPC models in volume. Product shortage has become somewhat of a tradition at Apple, which has frustrated users with its inability to keep the shelves stocked with an adequate supply of everything from the Macintosh Duo to the popular PowerBooks.

"I hope they can get enough of them because I just sold my [Macintosh] CI in order to clear the decks for the PowerPC," said Dwight Dolliver, a film production engineer at Pro-Vision Studios in San Francisco.

How many PowerPC machines will be available on the first day? No one at Apple is saying, although a spokeswoman said the company is "planning aggressively" and hopes to ship 1 million PowerPC-based Macintoshes by the end of the year.

Some Apple analysts have estimated that Apple will have more than 100,000 PowerPC machines worldwide ready for sale as soon as the new line is introduced.

MacWorld highlights

MacWorld show highlights included the following:

- **Apple buttressed its commitment to PowerPC by unveiling plans for a series of upgrade boards that will bring current Macintosh customers to PowerPC technology.**
- **An additional 37 third-party developers revealed plans to ship native PowerPC versions of their applications, bringing the total to 61. David Nagel, who heads the AppleSoft system software division, said he expects to have at least 100 native PowerPC Macintosh applications within 30 days of launch.**
- **Apple unveiled enhancements to its high-end Workgroup Server 95 product line that gives users an average of 40% higher performance when using Apple's latest file service product, AppleShare Pro 1.1.**
- **DayStar Digital, Inc. announced the PowerPro 601 PowerPC upgrade card for the Macintosh. The top speed is 80 MHz, and pricing should range from $1,200 to $1,700, depending on the selected speed.**
- **Aldus Corp. introduced a major upgrade to its Persuasion graphical software that includes a refurbishing of its user interface, new graphics tools and dozens of additional features. The price is $495.**
- **WordPerfect Corp. and Delta-Point, Inc. combined forces to unveil a Macintosh product suite for the small businessman. Integrated Home Office will sell for $295 and includes word processing, charting, graphics, finance and tax preparation features.**

Personal communicators

General Magic still not shipping

By Michael Fitzgerald

■ General Magic, Inc. last week came closer to releasing a product by announcing network navigation software and a personal intelligent communicator (PIC) operating system.

The Mountain View, Calif., start-up promised products last summer but has delivered little. Last week it said it was close to completing Telescript, an object-oriented communications protocol using intelligent agent technology, and Magic Cap, an operating system for personal digital assistants/PICs.

"Magic Cap is just another user interface, but Telescript I'm high on," said Kimball Brown, analyst at Dataquest, Inc. in San Jose, Calif. Brown said, though, that Telescript will take several years to make a market impact.

Big backers

General Magic's big-name backers — AT&T, Matsushita Electric Industrial Co., Motorola, Inc., Philips Corp. and Sony Corp. — continue to hang in with it and announced related developments. The most intriguing one may come from AT&T, which introduced PersonaLink Services, an effort to combine Telescript's intelligent agent technology with AT&T's EasyLink on-line service to provide sophisticated on-line shopping and services.

The intelligent agents are built around object-oriented technology, which allows both the agents and their "destinations" to be entirely programmable, according to General Magic.

Motorola said its Dragon I/68349 microprocessor will be used in Magic Cap and Telescript-enabled PICs due this summer from Motorola and Sony. Matsushita and Philips said they are developing Magic Cap-based systems to be announced late this year or early next year.

Some 20 vendors announced support for Magic Cap, including Oracle Corp. in Belmont, Calif., America On-Line, Inc. in Vienna, Va., and PenWare, Inc. in Palo Alto, Calif.

Intel faces RISC

CONTINUED FROM PAGE 1

price/performance differential between them and the mainstream RISC vendors is not so great as to lure many system buyers to RISC," said Michael Slater, publisher of the "Microprocessor Report" in Sebastopol, Calif.

Besides Chicago, IBM's OS/2 2.x offers Pentium support, specifically Pentium's virtual mode extensions, which allow DOS applications to run up to 10% faster. However, IBM is currently weighing how much more Pentium support it should include in the next point release of the product, expected in the third quarter.

"We are testing out the other advantages of Pentium to see what it buys users. But we aren't sure that some of [Pentium's] advantages buy users all that much," said James Schoech, a programmer in IBM's architectures planning group.

On the hardware side, analysts said the component-driven nature of system price drops does not necessarily signal a return to 1992's competition-inspired price wars.

Users said they would be more inclined to shift hardware purchasing to more powerful systems.

"What [the price drops] mean for us is we'll definitely step up our Pentium purchases," said a network engineer at a large Midwest pharmaceutical company.

He said his company was already specifying Pentium as a desktop standard and a significant drop in average Pentium pricing would only reinforce that. He added that users with systems at home, many of whom are using 80286-based systems that cannot run the Windows-based programs they use in the office, might also upgrade to 33/66-MHz DX2 systems if prices drop the way Intel predicts.

Brian Moura, assistant city manager and head of administrative services for the city of San Carlos, Calif., said lower prices could make him consider buying Pentiums, where "there is no reason to buy Pentium based on the present price/performance characteristics."

The DX4, based on the 1486 architecture, fills the gap in performance between Pentium and the 33/66-MHz DX2. Actually a clock-tripler that runs at 33 MHz externally and 100 MHz internally, the DX4 looks to become Intel's high-end processor until Pentium volumes increase [CW, July 19].

Geyer said the DX4 will run 40% to 50% faster than the 33/66-MHz DX2, hence the name. He acknowledged that Intel will do an OverDrive version of the DX4 but said that other rumored processor speeds for the DX4, while possible, are not planned.

Chip activity

Intel lowered prices on several processors late last year. It will also increase its number of plants producing Pentium from three to five in 1994, in preparation for Pentium making up 15% of the overall market. As of second-quarter 1994, a 66-MHz Pentium processor will cost $750 each in units of 1,000, down 14% from first-quarter pricing, while a 60-MHz Pentium will cost $675, down 15% from the first quarter. Meanwhile, a 33/66-MHz 486DX2 will cost $360, down 18% from its first-quarter price. Intel cut prices on its 25/50-MHz DX2, 33-MHz 486DX, 33-MHz 486SX and 25-MHz 486SX from 2.5% to 7.1%.

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Ft. Lauderdale, FL	Apr 28
Garden City, NY	Mar 3
Greenville, SC	Mar 23
Harrisburg, PA	Apr 19
Hartford, CT	Apr 26
Honolulu, HI	Mar 22
Houston, TX	Mar 10
Indianapolis, IN	Apr 13
Jacksonville, FL	Apr. 19
Kansas City, MO	Apr 6
Little Rock, AR	Mar 29
London, ONT	Apr 14
Los Angeles, CA	Mar 31
Memphis, TN	Apr 27
Milwaukee, WI	Apr 20
Minneapolis, MN	Feb 17
Montgomery, AL	Apr 21
Montreal, PQ	Mar 16
Nashville, TN	Mar 15
New Orleans, LA	Feb 24
New York, NY	Feb 15
Orange County, CA	Apr 12
Ottawa, ON	Feb 23
Philadelphia, PA	Mar 10
Phoenix, AZ	Apr 12
Pittsburgh, PA	Mar 31
Portland, OR	Mar 24
Quebec City, PQ	Mar 29
Raleigh, NC	Feb 22
Regina, SK	Apr 6
Richmond, VA	Mar 1
Rochester, NY	Apr 7
Rosemont, IL	Feb 3
Salt Lake City, UT	Mar 9
San Antonio, TX	Feb 2
San Diego, CA	Apr 13
San Francisco, CA	Apr 5
Seattle, WA	Feb 17
Somerset, NJ	Mar 15
St. Louis, MO	Apr 14
Toronto, ONT	Feb 16
Tulsa, OK	Apr 5
Tysons Corner, VA	Mar 9
Universal City, CA	Feb 2
Washington, DC	Feb 15
White Plains, NY	Apr 20

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TRBA

Outsourcing deal proves costly

By Thomas Hoffman

When Minolta Corp. entered a five-year data center outsourcing agreement with PKS Information Services, Inc. in Omaha last August, the Ramsey, N.J., business equipment supplier ran into an unexpected snag. It was hit with a six-figure surcharge from one of its software vendors to transfer its inventory control and order processing software.

The hefty surcharge surprised both Minolta and industry software analysts, who said application developers rarely resort to such fees.

However, the reason for such an uncharacteristic charge is obvious, according to Minolta's disgruntled Chief Information Officer Gary Gould: American Software, Inc. in Atlanta, the developer in question, was not among the five vendors considered for the outsourcing contract. American Software, Gould charged, is trying to penalize Minolta for the slight.

"I think it's retribution [on the part of American Software] for not being able to bid on the outsourcing deal," Gould said.

James McGuone, American Software's corporate secretary, said the company wrote a new agreement to enable PKS to run the software originally licensed to Minolta. "This is a common practice in the software industry for both application and systems software," McGuone said.

Opening the lens

MINOLTA AT A GLANCE

Primary line of business: copiers, printers, document imaging systems

Annual revenue: $800M

Annual information systems: $4M

Annual data center budget: $2M

IS staff size: 34

Projected outsourcing savings: $200,000 to $240,000 per year over five years

First time ever

Yet Robert Szalay, vice president of marketing at PKS, said American Software's licensing relocation surcharge represents the first time in all of PKS' outsourcing relationships that an application software vendor sought compensation for relocating software. "We've got over 300 application packages running here for multiple customers, and we've never seen this happen before," Szalay said.

Under the outsourcing agreement, slated to take effect this week, PKS assumes responsibility for the transfer costs for Minolta's systems software licenses but not for any application software licenses that are transferred for use by PKS, according to Szalay. Although unhappy about it, Minolta paid the surcharge, which Gould estimated at slightly more than $100,000, in late December.

The situation is akin to issues being raised in pending litigation between Electronic Data Systems Corp. and Computer Associates International, Inc. and several of their joint customers, including National Car Rental Systems, Inc. [CW, April 19]. CA is seeking damages arising from what it claims is National Car Rental's unauthorized use of CA software through its outsourcing relationship with EDS.

Minolta's outsourcing agreement calls for PKS to handle all of Minolta's data center activities.

Gould said Minolta decided to outsource its data center operations last April to reduce costs and capital investments by 10% to 12% annually while the $800 million copier and fax machine supplier determines its future operating platforms.

The decision has allowed Minolta to exhaust the lease on its IBM 3081 MVS/XA mainframe system and transfer to a PKS Amdahl Corp. machine

Starting out

American Software's nascent outsourcing activities, introduced a few years ago, represent less than $10 million in annual revenue. Among the company's half-dozen or so outsourcing clients is Dixie Yarns, Inc. in Chattanooga, Tenn.

Unheard of problems

Gould said he had fully expected to pay "nominal" relocation charges on the transfer of Minolta's systems software packages to the larger Amdahl processor, including a slight upgrade fee PKS paid to CompuWare Corp. to transfer an Abend-AID debugging support tool to the Amdahl machine.

But Gould was shocked to learn that American Software wanted to impose a 15% surcharge on the base licensing fees for its Inventory Control and Accounting, Customer Order Processing System and accounts receivable application packages, which Minolta has licensed since 1988.

"Everything I had researched indicated that the system software vendors were the ones to be concerned with," Gould said, regarding relocation charges. "I've never heard of problems on the applications side."

Industry ears

Neither had any industry software or outsourcing gurus familiar with such contracts. "I've heard of upgrade and transfer charges with systems software, but I'm not aware of any examples in application software," noted Stephen T. McClellan, a first vice president at Merrill Lynch Global Securities in San Francisco, who covers the financial performance of outsourcing and software vendors.

Other analysts said they believe the surcharge reflected the Atlanta vendor's attempts to secure additional revenue from Minolta.

Analysts said American Software's revenue — $107 million in 1993 — has shrunk 2% annually during the past two years as the vendor attempts to make the transition from selling IBM mainframe and AS/400 software to client/server packages. "It sounds like the buyer is still in the driver's seat, but given American Software's financial condition, who knows?" said Charles E. Phillips, a financial analyst at Kidder, Peabody & Co. in New York.

McGuone declined further comment.

IS eyes fax savings

CONTINUED FROM PAGE 1

tions or Ricoh Corp. this year to a system that supports Macintosh, Windows and mainframe users.

Meanwhile, Texaco, Inc. hopes to integrate fax capabilities into a companywide messaging network. "We've made an E-mail decision and are moving to address enterprise fax in 1994," said Don W. Price, a technologist at Texaco in Tulsa, Okla.

Although enterprisewide faxing is growing, broader implementation is held back by organizational issues.

Learning the patterns

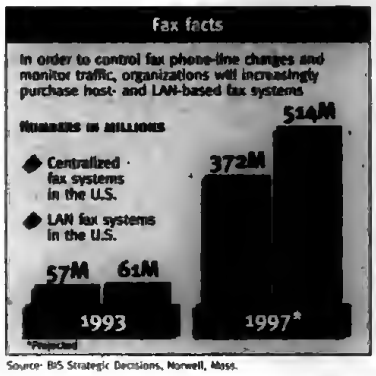
First, users must study fax traffic and patterns. But that is difficult because stand-alone fax machines and PC fax boards have proliferated quickly and chaotically from the grassroots level. That means many corporations have not documented their fax use, taken inventory of equipment, studied needs or set standards. Typically, no one in information systems has responsibility for fax systems, according to Eric Arnum, editor of "Electronic Mail & Micro Systems," a technology newsletter in Washington.

Also, managers must get their staffs to learn new work flows and ensure security. Controlling access to the private corporate network is a major concern, users and analysts said.

However, for companies that decide to face the challenges, the benefits are compelling.

Companies save big bucks on phone-line charges by routing fax traffic over internal networks because roughly half of corporate fax traffic is sent intracompany, according to analysts. For instance, Incotel, Inc., a communications software vendor in New York, estimates that its $75,000 fax system saves $260,000 annually for users who send 10,000 faxes per week. That amount includes savings in phone-line charges and "soft" costs such as employees' time.

Also, companies are looking to consolidate fax traffic from multiple dial-up lines to private T1 lines or public dial-up lines during reduced-cost hours. "When certain documents don't have to be there right away, we send them at night when rates are cheaper," said Tony Travaglini, an infrastructure technologist at Pepsi's Somers, N.Y., office.



Source: BIS Strategic Decisions, Norwell, Mass.

Pepsi has been using a departmental LAN fax server from American International Facsimile Products in Portland, Ore., since last summer in its purchase order department. That is possible because the fax software allows Travaglini to set parameters for batch processing of nonurgent transmissions at appointed times, he explained.

Additionally, centralized fax monitoring lets companies track usage and costs. A less tangible advantage comes in the form of productivity gains: Users can send faxes from their desktop computer queue rather than walk to a fax machine and wait for the fax. Some systems include sort routing and delivery of incoming faxes as well.

It's convenient

"We don't have any matrices; it's just more convenient. I know, because if the fax server goes down, people scream," said Albert da Cunha, MIS director at Visa International's risk management group. The group is using a department LAN fax server.

Although the main challenges are organizational, storage and network usage raise technical issues. Because fax image files are huge and traffic is heavy, network storage devices can become swamped.

However, early implementors of departmental and enterprisewide fax systems said the technical issues are not overwhelming.

"We've found that fax traffic is fairly evenly distributed throughout the day, so the networks don't get overwhelmed," said Michael Horan, technical support manager at Belden Wire & Cable Co. in Richmond, Ind.

Banyan Vines

CONTINUED FROM PAGE 1

tems, Inc. Unix platforms.

In addition, Banyan is in a "technology assessment phase" of choosing an open Unix kernel for native Vines, Johnson indicated. Candidates include offerings from Sun and Novell's Unix Systems Group. Development time frames have not been set, he said.

Native Vines currently runs on a proprietary version of Unix Systems Group's Unix System V Release 3.2, severely limiting the range of hardware platforms it can run on, as well as the network cards, programming tools and peripherals it supports, several users said.

"Native Vines is a closed, proprietary Unix that supports only what Banyan certifies," said Steven Wong, a network analyst at New York law firm Cleary Gottlieb Steen & Hamilton. This causes problems in areas such as backup, where native Vines offerings are unsatisfactory, he added. "With open Vines, you [would] have available everything out there that supports Unix."

Vines branches out

Banyan plans to expand its network operating systems reach. Some examples include the following:

HP/UX version; Windows NT client support; Vines client access to Windows NT servers	First-quarter 1994
Vines on IBM's AIX, Sun's Solaris	Summer 1994
Vines release update for SCO Unix; standard Unix kernel for native Vines	By year-end 1994 or later

Also in the works for this year is an update — to Version 5.5 — of Banyan's Santa Cruz Operation (SCO) Unix implementation of Vines.

Cleary Gottlieb is eager to receive the upgrade, which "will allow us to make use of more memory, more disk capacity and larger servers" than does the current SCO Vines Version 4.1.1.5, Wong said.

Widespread availability

The introductions are key to Banyan's competitive strategy of divorcing its global network services from the proprietary Vines and making them available across a variety of systems and network operating system platforms, said Ed Lauhach, a consultant at consulting and software development firm Datech Network Systems, Inc. "Banyan is committed to moving [its enterprise network services] to open platforms. That's where their future lies."

Another major product direction for Banyan this year aims to provide users with a "single system image" that guarantees access to the same basic set of services, via the same commands and icons, independent of the underlying platform, Johnson said.

Banyan began this work by filling in the gaps in individual platforms' service offerings, for example, adding PC print-and-file services to SCO Unix and a global directory to NetWare 3.12. This year, the vendor will work to ensure that "the user doesn't have to be aware of what type of server is providing the service in terms of the commands used to log on to the network, select a service or send a message," Johnson said.

In addition, a major new Vines release slated for the second quarter will have a Windows-based, embedded GUI for administering enterprise server installations, Johnson said. Users have been complaining for some time that Banyan's native interfaces to its administration tools are awkward and cumbersome to operate [CW, Oct. 4].

"We absolutely want GUI for administration tools," said John Good, director of information technology at Turner Corp. in New York. "It's frustrating to work in Windows for everything except Vines administrative work."

Good said he is also interested in Banyan's plans to ship in the first half of this year an enterprise backup service that it is developing with Legato Corp. "That would allow us to schedule a backup each night at midnight," he said. Banyan is also preparing to introduce by midyear Enterprise Data Distribution, a network service that will enable users to distribute and collect all types of data and network-based files across a heterogeneous network environment.

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Bill Jones, MIS, age 38

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News Shorts

CA motion denied; jury trial to ensue

U.S. District Judge John R. Bartels has denied **Computer Associates International, Inc.**'s motion to waive a jury trial in a breach of contract lawsuit filed by **Reliability Research, Inc.** against CA [CW, Nov. 22]. The lawsuit, filed in 1991, claims that CA breached a licensing agreement between Reliability Research and University Computing Co., which CA acquired in 1987. Reliability Research claims that CA owes it millions of dollars in international revenue from the sale of nearly 90 CA programs, including CA-Unicenter. The jury trial is expected to begin in Brooklyn, N.Y., at the end of this month. CA had no comment on the judge's decision. However, a CA spokesman said the company stands by its position that the case is without merit and "looks forward to having this matter definitively resolved in court."

Gateway revs up service programs

Under attack for service shortcomings, **Gateway 2000, Inc.** has expanded its Gateway Online Information Network by adding a new toll-free number for upgrading software drivers and giving users who buy a modem from Gateway a copy of CoSession Host. CoSession Host is a Tritoo Technologies product that lets Gateway support personnel remotely diagnose problems with customer PCs. Gateway will also offer CoSession Remote, a remote-access software package, for $29.95, more than 70% off its usual price.

Iomega restructures, cuts positions

Iomega Corp. in Roy, Utah, last week said it had restructured its operations to reduce overhead expenses, eliminating 50 positions corporatewide in the process. The cuts represent approximately 8% of Iomega's work force and take effect across the board.

PowerPC development tools debut

At Macworld last week, **Apple Computer, Inc.** introduced a series of products designed to ease porting to and application building for PowerPC-based PCs and servers. Announced was the $399 Macintosh on RISC Software Developer's Kit, a $150 self-paced training course called "Programmer's Introduction" and a native PowerPC development environment called CodeWarrior that will sell for $399.

Apertus acquires Systems Strategies

Apertus Technologies, Inc. has acquired **Systems Strategies, Inc.**, formerly a subsidiary of AGS Computers, Inc., for approximately $14 million. The deal will allow Apertus to meld its products, which link IBM computers to those of Systems Strategies, which in turn connect IBM machines to Unix platforms.

SHORT TAKES **Borland International, Inc.** said it has elected **Metaphor Computer Systems, Inc.** founder and Xerox PARC alumnus David Liddle to its board. Liddle is co-founder and president of **Interval Research, Inc.** ... **Digital Equipment Corp.** hired Ellen Kokos as vice president of product marketing development for emerging markets such as multimedia. ... G. Glenn Henry, longtime **Dell Computer Corp.** technology guru, who was most recently Dell's chief technology officer, resigned to become PC division director at **Mips Technology, Inc.** At Mips, Henry will work to help PC makers develop PCs based on Mips' RISC technology. ... **Data General Corp.** said **Informix Systems, Inc.**'s Informix-OnLine Dynamic Server 6.0 database will be available on its Avlion server line later this quarter. ... **Zeos International, Inc.** in Minneapolis announced plans to purchase mail-order competitor **CompuAdd Corp.** [CW, Nov. 8]. Details of the deal were not disclosed.

Midrange systems

AS/400 preps for RISC

Package changes allow minicomputers to get PowerPC upgrade

By Craig Stedman

■ IBM plans to make its next batch of AS/400 machines RISC-ready by putting them in new cabinets that support processor board upgrades to the PowerPC-based versions slated for introduction in 1995. The RISC-ready models are due out in the second quarter.

The changes will be most noticeable on higher-end machines, which are being switched from the 9406 rack-mount package to a regular frame enclosure the size of a small file cabinet.

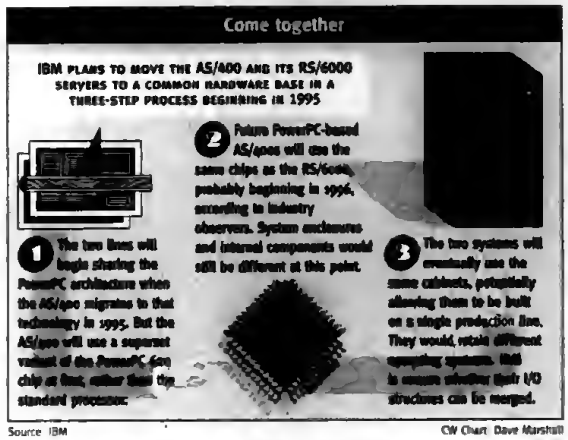
The high-end enclosure will be just "a little bit bigger" than the 9404 cabinet now used in the middle of the line, noted Glenn Van Benschoten, director of systems product management at IBM's AS/400 Division.

Regular upgrade pricing

Because of the system packaging changes, existing AS/400 boxes will have to be replaced in order to move to the 1994 models, which would be the G Series in IBM's usual lettering sequence. However Van Benschoten reiterated that IBM plans to price the exchanges as regular upgrades rather than new system purchases, even if the only feature retained from the current machines is the serial number.

Kevin Beam, director of research at Reliability Ratings, Inc., a Needham, Mass., market research company, said upgrades may be "technically difficult" because of the need to reconfigure the systems. But he added that as long as IBM follows through on its pricing promises, cost should not be a major concern for users unless they still have the original AS/400 B models dating to 1988. IBM's pricing usually "starts to punish you" the longer you wait to upgrade, Beam noted.

James Bailey, senior vice president of data processing at Massachusetts Financial Services in Boston, said pricing incentives will be necessary "to help people get over the mental hurdle of making the jump" to the new AS/400 cabinets when they could switch systems almost as easily.



Source: IBM

CW Chart: Dave Marshall

"It's been such an easy path to move up" within the AS/400 line to date, Bailey said. "Now you have to stop and ask yourself if you're better off going to another platform. It's not a light decision." He added that it is still too early to decide on his company's upgrade plans.

Roger Finoli, manager of planning and technology at Dominion Textile, Inc. in Montreal, said the two-step transition to PowerPC sounds appropriate "as long as IBM offers pricing that is acceptable" on upgrades to the systems being introduced this year.

Money saver

The reduced footprints promised at the high end of the line are particularly appealing, Finoli added.

"If a box is smaller and uses less power, that saves us money every day," he said. However, he noted that Dominion Textile has not decided whether it will buy the 1994 models or wait for PowerPC.

Users who implement the 1994 models as all-new systems "are essentially looking at a processor upgrade" to the PowerPC technology, Van Benschoten said.

Customers who retain their old machines, such as disks or I/O controllers, may also have to upgrade those parts in order to move to PowerPC, Van Benschoten added.

Hammer, CSC Index take different paths

Re-engineering's best-known partnership has split up.

Citing divergent interests, Michael Hammer and CSC Index last week officially ended a relationship that stretched back to the mid-1980s. Both sides characterized the parting as "peaceable."

"Our interests and paths diverged," Hammer explained, adding that Hammer & Co. will continue to focus on educating businesses about re-engineering methodology.

A CSC Index spokesman said research activities undertaken by the two would be moved to the newly created CSC Foundation.

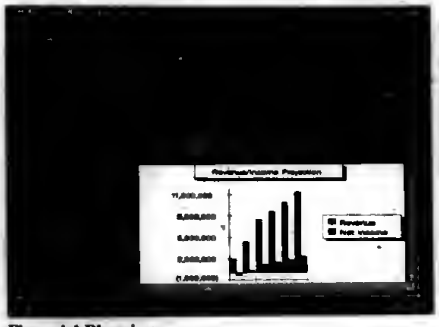
"For the last year and a half or so Mike and Index had been pretty much doing their own things anyway, except for the PRISM research service and the book," a CSC Index spokesman said. "So it's really not much of a change for either party."

Michael Hammer *and CSC Index split because "Our interests and paths diverged," Hammer said*

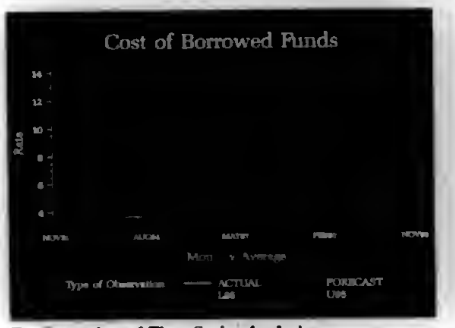
Last year, Hammer and James Champy, president of CSC Consulting Group, co-authored *Re-engineering the Corporation*, which has been a best-seller for nearly six months.

Hammer & Co., which had been subleasing space in CSC's Cambridge, Mass., headquarters, will move to a new location in the same city later this month.

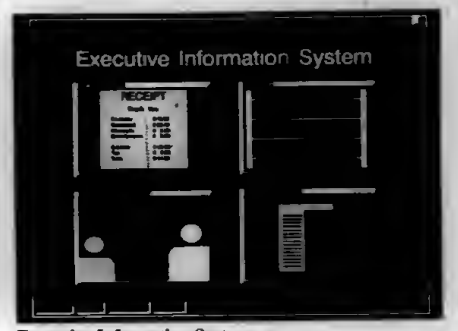
— Joseph Maglitta



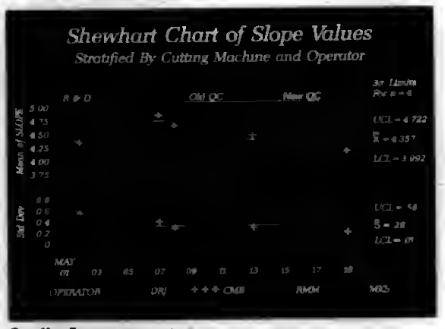
Financial Planning



Econometric and Time Series Analysis



Executive Information Systems



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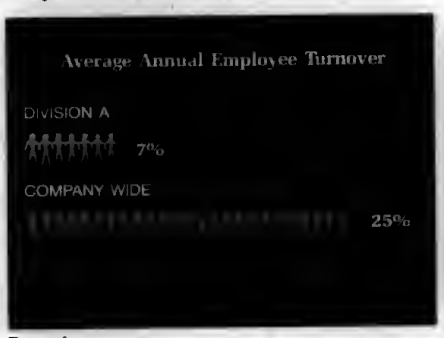

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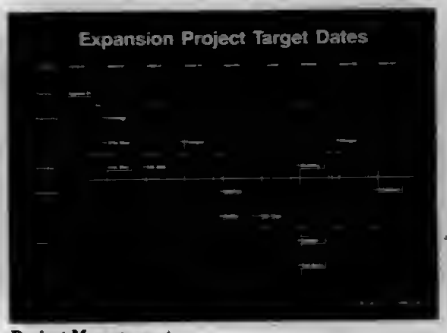

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Desktop upsizing

PC DBMS next stage of client/server fight

By Michael Vizard

A battle over who can best leverage the move to client/server is about to erupt between the two leading suppliers of dBase-compatible databases — Borland International, Inc. and Microsoft Corp.

In the latter part of the second quarter, Borland plans to deliver an overdue dBase IV for Windows that will be positioned as a front end to SQL databases in order to take advantage of an expected upsizing trend.

Similarly, Microsoft is expected to include direct links between FoxPro and SQL databases in FoxPro 3.0, and Computer Associates International, Inc. is expected to pursue a similar course with its Clipper database.

"For the past five years, downsizing has been the most important issue. We believe that upsizing will become the most important factor starting in the second half of 1994," said Borland chairman Philippe Kahn.

One driving factor behind this trend is the number of XBase-compatible database systems that are running out of capacity. Thus far, most of the moves to client/server computing models have been based on departments downsizing from minicomputers and mainframes to servers running SQL databases.

But the next wave of client/server upsizing will create substantially more difficult technical challenges as organizations move to tie their existing PC database resources into an enterprise-wide computing architecture anchored by distributed SQL databases, which require more database administration than PC databases such as dBase and Microsoft's FoxPro.

"There's extremely little enterprise-wide client/server today because it's very complicated and requires new skill sets. The prices of the SQL databases are coming down, but a lot of people are still put off by the complexity," said Rich Finkelstein, president of Performance Computing, Inc., a consulting firm in Chicago.

Technical hurdles

Finkelstein noted that while most customers will want to leverage their existing investments in XBase databases by using them as front ends to SQL databases, they may find that the technical hurdles will make offerings such as Borland's Paradox or Microsoft's Access databases more attractive. This is because these databases share the same record-oriented relational database architecture as SQL databases.

"Borland and Microsoft are probably telling customers what they want to hear. But right now we rarely contemplate XBase databases for client/server. We see them being used to build quick-and-dirty applications," Finkelstein said.

But Kahn maintains that a huge installed base and customer attachment to the dBase programming language will give XBase databases a big role to play in client/server computing.

"People will want to leverage their hardware and software infrastructure," Kahn said.

And some users said they are looking forward to client/server computing using XBase databases.

"We've become a big believer in NT and tying it all together in a client/server architecture," said Craig Church, president of Buena Vista Software, Inc., an independent software developer based in Palo Alto, Calif.

As a developer of accounting applications on FoxPro, Church said he expects to tie FoxPro into SQL Server from Microsoft. "We were skeptical when Microsoft first acquired FoxPro, but FoxPro for Windows is now a stable and useful product that runs cross-platform. This may be an illusion, but it is harder to sell Borland than Microsoft to corporate accounts moving to client/server because Microsoft has a relationship with Sybase for SQL Server," Church said.

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Legent, Software AG ramp up services

By Gary H. Anthes

Legent Corp. plans this year to double its professional services staff, after tripling its ranks last year, to address heightening needs by systems management customers for training and consulting.

While still a relatively modest part of its business — $11 million last year on total revenue of $442 million — professional services is one of its fastest-growing business segments, the Herndon, Va., company said.

Just a few miles away in Reston, Va., Software AG of North America, Inc. is reporting a similar boom in demand for professional services, as customers increasingly view software vendors as partners in the struggle against increased competition, shrinking budgets and growing systems complexity. The company now derives more than 25% of its $120 million in annual revenue from professional services.

Both vendors have awakened to a market long cultivated by the likes of Computer Associates International, Inc., Lotus Development Corp. and Microsoft Corp.

Legent and Software AG say users want to deal with a small number of well-established vendors, and they no longer feel comfortable buying software off the shelf like soap flakes. "Customers are looking for software vendors to be much more [like] integrators than in the past," said Jonathan Church, director of central services at Software AG.

"More and more customers — especially those moving to client/server computing — are saying they want their software suppliers to do soup to nuts on the application," agreed John Logan, executive vice president at Aberdeen Group, a Boston consultancy.

Logan said Germany-based Software AG's U.S. operation is coming to the professional services game relatively late; its overseas units have been strong in consulting and application development for years. He said Software AG, as well as most major software vendors, finds it difficult to train employees quickly enough.

Legent offers pure management consulting on issues of long-range planning, outsourcing, data center consolidations, major hardware and software upgrades and the like. It also offers presale and postsale consulting and training associated with the installation and use of particular products.

Excellence

Last month the Software Support Professionals Association in San Diego gave an award for excellence for most improved service to Software AG of North America. It was based on "the most dramatic increase in the quality of support," as indicated in a customer satisfaction survey.

Worth the cost

When Fortis Benefits Insurance Co. in Woodbury, Minn., paid $150,000 for Legent's Endevor products for software management, it opted for an additional $10,000 worth of training and consulting. Mary Bauer, data center manager, said the outlay for professional services, which secured a consultant for four weeks to help set up a prototype and also provided two weeks of on-site training, was a good investment. She said it would have taken three to four times as long to get Endevor installed without the consulting services.

William Maguire, information systems program manager at the U.S. Postal Service, said Legent analyzed a myriad of cost and performance data from two mainframe centers and came back with reports showing they were spending more in certain areas than comparable centers. The Postal Service has since given renewed attention to automating its security operations, he said.

Maguire also said the Legent analysis, provided at a "significant discount" off the list price of $50,000 per data center, let the Postal Service compare what it was paying for some 400 software products with what its peers were paying.

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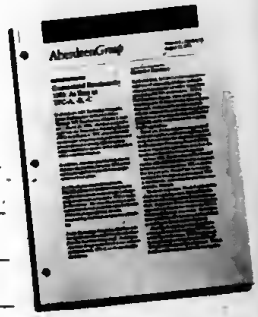

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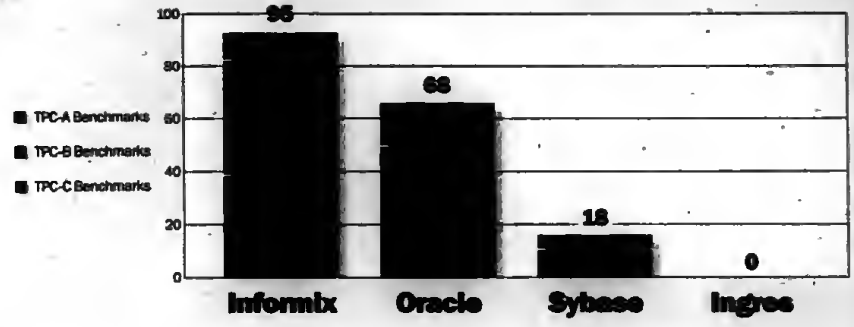

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Airport prepares for takeoff

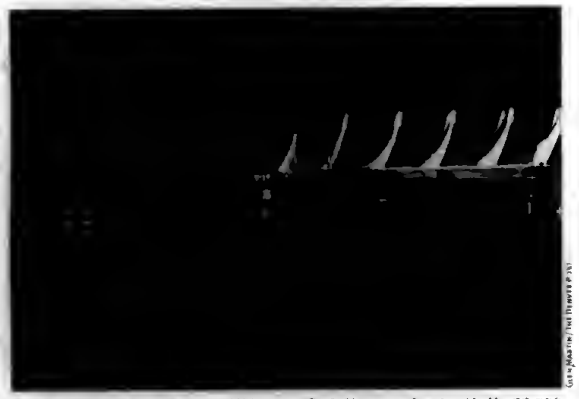
Largest such U.S. site in 20 years sports fiber-optic, unified network

By Ellis Booker

At 11:59 p.m. on March 8, Stapleton International Airport in Colorado will close its hangars for good, while 20 miles away, the new Denver International Airport will begin operations.

The largest U.S. airport since the opening of the Dallas/Fort Worth Airport 20 years ago, Denver's new, $3.1 billion facility will sport a state-of-the-art campus network that will benefit both the airlines and the flying public.

In a major technical advance over Stapleton — built in the late 1920s — and other U.S. airports, the voice and data networks at Denver International will be based almost exclusively on fiber optics.



Denver International Airport *will house 17 airlines and potentially 20,000 workers over 54 square miles*

Denver officials were reluctant to divulge the total cost of the network infrastructure but said the initial contract with wiring contractor US West was for $25 million.

Video and multimedia applications

The literally hundreds of LANs and thousands of computers and electronics belonging to the city of Denver, the Federal Aviation Administration and the airlines will be networked across a 100M bit/sec. fiber backbone network owned and operated by the city and county of Denver. This network infrastructure, according to airport and airline officials, sets the stage for future video and multimedia applications.

"It'll let us put up a variety of advanced applications that our research people have developed and prepare us for applications in the future that will require that kind of bandwidth," said Bob Restivo, director of computer operations and technical support at Chicago-based United Airlines. United will have a major hub operation at the airport.

For instance, United plans to transmit video from the jetway directly onto workstations used by its gate personnel so that it can more accurately note the status of incoming and outgoing flights.

Plans for moving equipment and personnel on March 8 from Stapleton to Denver International — a massive event affectionately known as Push Night — began a year ago.

Central network

Planning the airport's new networks began even earlier.

"Designing the telecommunications infrastructure began four years ago," said David Smith, telecommunications manager at Stapleton and the new airport.

"We had very little fiber at Stapleton . . . and we didn't have a backbone, so the LANs didn't communicate," said Smith, one of 14 staffers in Denver International's MIS department. By comparison, the new airport's cabling contractor, US West, has already deployed some 5,300 miles of fiber at the facility.

Plans to centrally maintain the airport's network infrastructure will also greatly simplify network maintenance at the sprawling airport. Centralized network management will be handled by Hewlett-Packard Co.'s OpenView on Sun Microsystems, Inc. SPARCstations. OpenView will monitor the backbone network, which will be composed of the Fiber Distributed Data Interface (FDDI) rings and 20 to 30 Fibermux Corp. concentrators and Wellfleet Communications, Inc. routers. The concentrators and routers will comprise intelligent nodes, from which will hang Ethernet and Token Ring LANs operated by the tenants.

According to Smith, if the tenants put in the correct network interface card, the airport might be able to use OpenView to look all the way down into the workstation and potentially offer service and maintenance of the LANs.

Thus, Smith's group will take over responsibility for building wiring up to the 10,000 or so wall plates.

At Stapleton, each tenant was responsible for its own premises wiring — a situation that could result in chaos when a carrier went out of business.

"When Frontier Airlines went out of business several years ago, we never knew their networking plan," Smith notes. "So no one could use their [miles of cabling and conduit]."

In addition to the FDDI network for digital data, there will be two other separate fiber networks at Denver's latest airport: one for video and one for voice.

A second fiber network will support 750 or so video security cameras at Denver; a third fiber network will use the 2.4G bit/sec. Synchronous Optical Network protocol for linking private branch exchanges to an on-premises AT&T 5ESS digital switch operated by US West.

Cable planning

The LANs themselves will use twisted-pair cabling because fiber-to-the-desktop was deemed too expensive. However, clearly anticipating a demand for greater bandwidth in the future, Denver built its new airport with Category 5 twisted-pair, which will run at 100M bit/sec. when electronics for it are available.

In addition, the airport will lease two other services to its airline tenants: flight information and baggage monitors. These applications will fetch relevant data from each airline's information systems. "It's cheaper for us to run the whole thing, and it's a lot easier on our flying passengers, since they get continuity from one concourse to the next," Smith said.

Data centers in triplicate

There will be three data centers at the airport: the administration system, which runs on a IBM 9370 mainframe at Stapleton and will run on an IBM ES/9000 mainframe at Denver International; the huge three-part maintenance group responsible for the airfield, equipment fleet and the airport buildings running on a large AS/400; and IBM System/36s for the operations department.

Brave new world

"United has been automated for years, but the infrastructure being provided at Denver is so far ahead of what we usually work with at airports that we have upgraded our own systems to take advantage of it," said Fred Wilson, the United Airline's project manager responsible for the computers and communications at Denver International Airport.

For United, one of the most interesting applications possible under the airport's high-speed network is limited desktop video. For instance, video capability will be provided on some of United's 2,000 Intel Corp. 486-class workstations. This will permit gate agents to look down a jetway to view an aircraft or check the staffing requirements at another of United's 50 gate positions.

Video will also come into play behind the scenes, allowing United's maintenance engineers to see digitized repair manuals and, eventually, video clips.

United is currently testing this application in San Francisco and plans to make its first large-scale deployment in Denver. Another use of video will be for training or point-to-multipoint corporate broadcasts.

United will also deploy a handful of new applications, including GAPS (gate assignment and planning system), a second-generation software system based on a system used at Chicago's O'Hare and Denver's Stapleton airports, to monitor United's 50 gates at Denver International Airport. GAPS runs under HP/UX on an HP/9000 platform. —*Ellis Booker*

Raft of radar

At a total height of 327 feet, the Airport Traffic Control Tower at Denver's new airport is the tallest the FAA has built in the U.S.

The Terminal Radar Approach Control center, usually located at the base of an airport's control tower, will be three miles away, networked to the Denver tower via dedicated fiber.

Two Airport Surface Detection Equipment systems will be used at Denver International to monitor activities such as taxiing aircraft. Most airports have just one such system, but Denver will sport three of the systems eventually.

Denver's Terminal Doppler Weather Radar, which detects weather hazards in the terminal area, is based on several years' work at Stapleton International Airport in a National Weather Service development program.

The first such weather radar was placed at Houston Intercontinental Airport in 1993; the new Denver airport's weather radar is one of six being commissioned by the FAA.

Standard runway approach software was deemed unable to give adequate warning for the new Denver site, which will be the first in the country to have three parallel landing paths. Therefore, a Final Monitor Aid was developed specifically for Denver to keep planes out of one another's airspace on approach.

—*Ellis Booker*

3Com to unveil 24-port stackable hub

By Stephen P. Kletti Jr.

3Com Corp. in Santa Clara, Calif., said it will ship this week its first 24-port stackable hub for Ethernet networks at price points 18% to 38% below those of its competitors.

An extension to 3Com's family of LinkBuilder FMS 12-port hubs, the hub will cost $103 per managed port and $71 per unmanaged port, the company said. Up to four hubs can be stacked and linked by a hub expansion cable to form one logical repeater that provides up to 96 ports.

Equivalent to competitors

Analysts said the hub's features — specifically, port density and manageability — were equivalent to competing products from companies such as Cabletron Systems, Inc., SynOptics Communications, Inc. and Networth, Inc. but cost roughly $20 less per port.

"3Com's port density is not unique, but its pricing is," said Mary Petrosky, an analyst at The Burton Group in San Mateo, Calif. "Users can probably count on everyone being close to them within a quarter," she said.

While stackables are not as intelligent, as the more expensive chassis-based hubs, their pricing makes them an attractive option for users who are new to networking, analysts said. That is because these hubs provide a basic connection for users seeking to link up LANs.

Such is the case for beta site Montgomery County in Dayton, Ohio, which is in the process of installing 18 of the new 3Com hubs to connect seven justice departments spread throughout five buildings, according to Nancy Long, a network manager for the county.

"We're not sure where our network is going in terms of imaging, for example, so we didn't want to spend a lot of money on something and then have to [replace it]," she said. "Stackable hubs gave us the most flexibility at a better price," she added, referring to their ease of reconfiguration.

This combination of flexibility and price should make 1994 a hot year for stackable sales, which analysts expect to as much as triple while chassis-based hub sales plateau.

Net-ready server on tap

By Michael Fitzgerald

Novell, Inc. and Zenith Data Systems will take a stab at the market for small workgroups this week when they combine to introduce a turnkey server that promises easier network configuration.

The Z-Stor Personal Server offers out-of-the-box networking for corporate workgroups and small business environments of up to 20 users. A base price of $999 includes Novell DOS 7 and Personal NetWare, built-in 10Base-T connectivity, remote management software and a 210M-byte hard drive.

"It's an innovative approach, and I think they'll be attractive boxes for small business and corporate users," said Randal Giusto, an analyst at WorkGroup Technologies, Inc. in Hampton, N.H.

Corporate users

At least one corporate user disagreed. "I don't see us using this, except perhaps as a test server," said a network engineer at a large Midwestern pharmaceutical company who asked not to be identified. The engineer did call the Z-Stor "a great concept, and the price point is fantastic." But, he said, "This is targeted at the small office."

The Z-Star Models 400 and 1000 are based on a 25-MHz 486SLC processor from Cyrix Corp. The $1,599 Model 1000 has a 500M-byte drive and, with the Stac Electronics, Inc. Stacker compression software included in DOS 7, supports up to 1G byte of storage.

The Z-Star also includes SCSI-2 support as well as a network monitor. A PCMCIA slot is included for either a Token Ring adapter or a fax modem.

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And if providing top service under normal circumstances is data-intensive, imagine the challenges when anything resembling a disaster strikes (like the California fires, for example, or Hurricane Andrew).

Understandably, insurance companies count on mainframes to give the rest of their computer networks the enormous power they need to perform this herculean task. By being linked to a mainframe, every PC and workstation has access to the voluminous amount of data they have to contend with day after day.

Like most information-intensive businesses, the insurance industry knows that nothing can "serve" the rest of their computer networks' "clients" to nearly the degree a mainframe can. And today's mainframes are more open than ever before to serving just about any kind of hardware and software.

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Briefs

Adobe earnings up

Adobe Systems, Inc. in Mountain View, Calif., reported revenue for fiscal 1993 of $313.4 million, an 18% increase from fiscal 1992. Net income was $57 million, compared with $43.6 million for the same period a year ago. Fiscal 1993 net income includes a nonoperating gain of $3.9 million on sale of common stock held as an investment.

Acquisitions pick up

Merger and acquisition activity is on the rise in the industry, as evidenced by a series of recent announcements. Networking vendor **Attachmate Corp.** said it purchased for an undisclosed amount **KEA Systems Ltd.**, a privately held maker of connectivity software.... **Computer Sciences Corp.** has acquired **ARC Professional Services Group**, an information services group that mainly supports government clients.... Software service provider **Keane, Inc.** in Boston said it has completed its purchase from **Nynex Worldwide Services Group, Inc.** of a number of firms, including **AGS Information Services** and at least four other related businesses.... Tucson, Ariz.-based **Artisoft, Inc.** said it has purchased for $9.9 million certain inventory and assets — the products, brand name and $7 million in inventory — of **Anthem Electronics, Inc.**'s **Eagle Technology** business unit, a maker of network devices .... **Automatic Data Processing, Inc.** said it intends to buy the assets of **TriStar Market Data, Inc.**, a provider of financial services software.... **ASA International Ltd.**, a maker of vertical market applications, said it intends to purchase **Automation Partners, Inc.**, a supplier of computer products to the legal market.

SHORT TAKE **Radio Shack** has signed an agreement to open its first store in Russia.

Symantec buys DataEase unit

By Michael Fitzgerald,

Symantec Corp.'s year-end purchase of certain technologies from relational database maker DataEase International, Inc. is part of an overall move by Symantec to diversify beyond its roots in the utility market, analysts said.

Symantec paid $7.5 million — $1 million in cash and $6.5 million in stock — for DataEase subsidiary Rapid Enterprises, Inc. two weeks ago.

Symantec, which has been codeveloping software with Rapid Enterprises since last April, received DataEase's Prism technology, which provides a way to exchange data stores across multiple platforms, according to a DataEase spokesman. Symantec also bought a series of drivers that gives DataEase products access to data resident on servers that support Open Database Connectivity, Distributed Relational Database Architecture, Enterprise Data Access/SQL and AS/400, he said.

DataEase will continue to market its database, he added.

Symantec officials refused to disclose what they purchased. Rapid Enterprises, however, was building a fourth-generation development tool that could provide Symantec with the building blocks for a client/server application development language, observers said.

The purchase could help Symantec further expand beyond the utility market, according to Andrew M. Seybold, editor-in-chief of "The Outlook on Professional Computing."

"Symantec may be positioning itself to be a serious player in languages," Seybold said.

Diversification is critical, he continued, adding that operating systems vendors are chipping away at the utility market.

"We've recognized, and customers are telling us, that re-engineering and employing client/server architecture are huge emerging markets," explained Ted Schlein, Symantec vice president and general manager of enterprise systems.

DataEase founder Arun Gupta will join Symantec as principal architect of the enterprise tools division.

Team players

SYMANTEC CORP., CUPERTINO, CALIF.:
A $257 million software company best known for development tools and utilities such as Norton Desktop and Guideline project manager. On an acquisition spree: Recently purchased Fifth Generation Systems, Inc. and Contact Software International, Inc.

DATAEASE INTERNATIONAL, INC., TRUMBULL, CONN.:
A $33 million relational database maker that has suffered a sales drop because its namesake database was unavailable in a Windows version. A year ago, DataEase created a separate subsidiary called Rapid Enterprise, headed by company founder Arun Gupta and dedicated to building high-end client/server tools.

THE PARTNERSHIP:
Symantec and Rapid Enterprise started working together in April 1993. To get cash, DataEase sold Rapid Enterprise to Symantec. Among the technologies Symantec now owns or jointly owns with DataEase are Prism client/server development technology and several cross-platform SQL tools.

Development tools

Angoss eyes unified office suite

By Derek Slater

■ Angoss Software Corp., which spent most of 1993 gobbling up technology companies and products, has kicked off the new year in the same mode. Last week, the company acquired a range of cross-platform development tools and database performance enhancement products.

These offerings, acquired from San Mateo, Calif.-based Trifox, Inc., join an increasingly crowded Angoss product lineup that at first blush appears a very odd mix. However, the gamut of office automation software, query tools and development aids is actually helping to form the foundation of the company's vision.

Following its year-long acquisition spree, the Toronto-based company now offers an integrated suite of office applications, a rapid application development (RAD) tool, an artificial intelligence-based query tool and a PC voice-recognition product in addition to the Trifox tools and utilities.

The unifying vision behind this assortment is a plan to build office automation software with built-in intelligence capable of learning how best to support the individual user, according to Lynne Stethem, Angoss president and founder.

The linchpin in Angoss' strategy is the SmartWare line of integrated applications, purchased from Informix Software, Inc. for roughly $15 million in 1993. SmartWare gives users spreadsheet, database and communications functions as well as a programming language. Angoss built a second product, the Angoss RAD tool, using SmartWare's programming capabilities.

Tight integration between Angoss RAD and SmartWare allows users to quickly build applications to automate office procedures, Stethem said. Last summer, Angoss also purchased KnowledgeSeeker, an artificial intelligence-based data analysis product, and launched a co-marketing and development pact with Dragon Systems, Inc., a Newton, Mass., voice-recognition vendor. That agreement will allow SmartWare users to initiate database queries with voice commands.

Angoss has its work cut out because SmartWare and its ancillary products will fight for sales in arenas where the big boys play. On the applications side, suites from Microsoft Corp. and Lotus Development Corp. are continually improving their level of integration, while vendors such as Progress Software Corp. compete on the development side.

Andrew Blum, a financial analyst in Yorktown Heights, N.Y., noted that combining the SmartWare suite with quick development has won Angoss a loyal following of developers and resellers. That is the same strategy that Progress Software used successfully while competing against much larger foes, such as Oracle Corp.

AT A GLANCE

ANGOSS SOFTWARE

INCORPORATED: 1984

1993 REVENUE: $8 million

1994 ESTIMATED REVENUE: $35-$40 million

NUMBER OF EMPLOYEES: 30

KEY PRODUCT: SMARTWARE
(An office application suite and programming language; has an installed base of more than 500,000 users)

Breaking in

However, Angoss needs to break SmartWare into new information systems-level accounts. Stethem noted that SmartWare currently tends to be purchased by small companies and end-user departments rather than by centralized IS buyers, in part because SmartWare stayed strictly on the back burner at Informix.

However, by providing development tools that end users can work with, SmartWare can relieve IS of some of the programming burden.

Angoss is betting on two other key factors: First, SmartWare has a large installed base of more than 500,000 users; and second, the combination of SmartWare with a RAD tool and an artificial intelligence query tool is practical and unique, according to Stethem.

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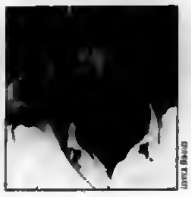
Thomas Watson Jr.: Great thoughts



1914 to 1994

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"Tom Watson was a remarkable man who transformed IBM to a computing industry giant that made possible the computer age. He will be remembered for his adventurous spirit, sense of fair play and the vigor of his friendship." —*Louis Gerstner, Chairman, IBM*

"Tom Watson delivered IBM into the computer era. It was his leadership and persistence that shifted them from a tabulating company to the world's largest computer company." —*DuWayne Peterson, former chief information officer at Merrill Lynch*

"He is clearly at the top of the computer industry and company creators' list. He provided a vision and dream for computing as a leader at a time of technology turmoil." —*Gordon Bell, PDP-11, VAX architect*

"An inspiring leader who motivated people to strive for and achieve exceptional goals by expressing so effectively his respect for the dignity and worth of each individual. Were it not for his courageous actions in pushing the frontiers of computer technology, the information market as we know it today would not exist." —*Pat McGovern, Chairman, IDG*

"Tom Watson was a true giant who impacted positively everybody who knew him. Rare today is the individual who combines his business acumen, concern for the consequences of new technology on society and a deep respect for the individual and molds this into effective actions." —*Erich Bloch, IBM fellow and former director, National Science Foundation*

"Wherever he is today, Watson would appreciate being remembered for his charitable efforts, particularly in higher education and medical research." —*Ben Rosen, venture capitalist, Compaq chairman*

"He really created the industry we've known for the past 30 years. He put in place and directed IBM into subsequent dominance." —*Max Hopper, Chairman, AMR Corp.'s Sabre Technology Group*

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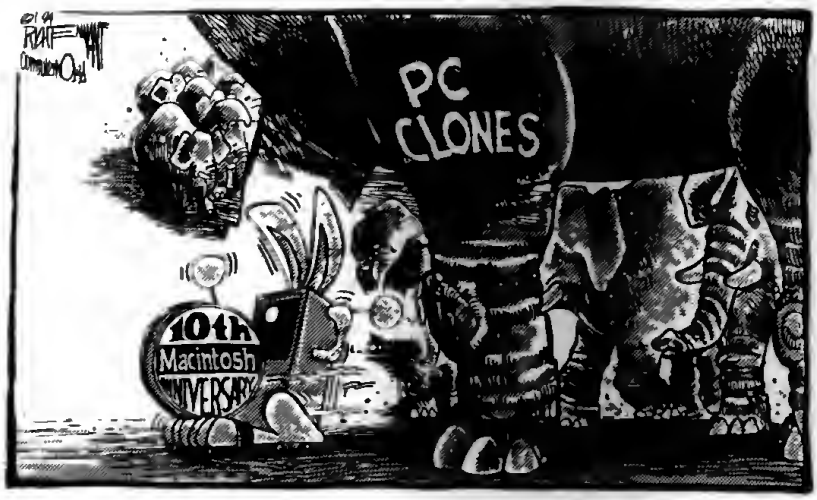
—*Compiled by Erin Callaway*



Voice recognition: noise pollution?

Regarding Esther Dyson's column on voice recognition, "Say it, point to it or type it" [CW, Nov. 15], PCs with voice recognition will have a number of drawbacks.

Heavy use of voice commands will increase already high noise levels and add to distractions.

Imagine walking through an office and hearing random voices saying or shouting, "Add a window!" "No, sum it the other way!" or "Boldface!"

A new method of employee observation by management might be to tiptoe near an employee's cubicle, and if appropriate commands are not heard at intervals, to assume the employee is sloughing off.

A great source of pranks will be people walking by cubicles and shouting out commands to other employees' PCs.

Ross Pavlac
Evanston, Ill.

Work invades the home environment

Obsessive work is what Ellis Booker is writing about in his column, "Work escapes the office," [CW, Nov. 29]. Not only can you take your work home, but you can also take it on the subway, to a cookout — wherever you think best.

Yes, but home doesn't go to the office, does it? Home stays put.

It's just that home activities are now cut back and interrupted while you punch your laptop, tap your voice mail, etc.

I can now see that voice mail and the modem-equipped laptop are only going to help me escape my home pleasures and responsibilities.

Bob Mahony
Yonkers, N.Y.

The benefits of CNE certification

"The meaning of certification" [CW, Dec. 6] presented an inaccurate assessment, misinformation and a very nonobjective viewpoint.

Sure, many people in the computer industry have a Certified NetWare Engineer (CNE) designation, but if the CNE certification were not in demand or deemed of value, it would have been long gone. Instead, it is now going into its fifth year.

I do agree that a company should not hire someone simply because he has a CNE certification. But how will a company know whether the applicant is at least in the ballpark if some conditions are not used?

Certainly a CNE/Enterprise Certified NetWare Engineer (ECNE) certification is a good indication that the candidate has a certain NetWare background.

As a Certified NetWare Instructor for a number of years, I have seen many "paper CNEs" certified when they should not have been. However, this situation is being reviewed at the moment, and the testing procedures are being improved on.

The statement "The demand for courses pressured Novell to contract the training to Novell Authorized Education Centers" is utterly untrue. The Novell Authorized Education Centers channel was in place long before the CNE program came about. It was not well known because it catered mostly to the Novell resellers.

I also have yet to come across a Request For Quotation that asks about Novell certification. Any vendor that quotes a system knows in advance whether its hardware will work with NetWare.

I feel that Mr. Hertz's article is inaccurate and that your publishing it without verifying all the facts has done injustice to the CNE/ECNE program.

Peter Kuo, Ph.D.
NetWare Instructor ECNE
Richmond Hill, Ontario, Canada

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The Deming legacy

Ellis Booker

W. Edwards Deming, who died last month at 93, was neither a computer expert nor a titan of the information systems industry. But his theories about total quality management and continual improvement did have a profound impact on the computer and electronics industries — first in Japan in the 1950s and 1960s and belatedly in the U.S. in the 1980s.

It was Deming who recognized that it was simply cheaper in the long run to produce quality goods. Rather than state the intuitive — that defects annoy customers and may cause them to stay away — he quantified the losses, proving with hard numbers that the cost of repair, retooling and rejects was higher than the cost of "getting it right the first time."

Deming contended that any process, no matter how complex, could be analyzed, measured and improved. He warned strongly against rewarding or punishing workers on the basis of results they are not, in reality, able to control. A high percentage of errors (up to 85%), Deming felt, were caused not by workers but by factors outside of workers' control. Deming maintained that workers want to work and do well but are too often stymied by poor management and poor processes.

> W. Edwards Deming still isn't a familiar name to many IS managers, but it ought to be.

A testament to the power of Deming's ideas is that they have migrated beyond the manufacturing sector and into the services industry, from fast food chains to catalog companies selling kids' clothes.

For Warren Harkness, director of information services at Bose Corp., Deming's concepts, encountered through videotaped lectures five or six years ago, had both a personal and a business impact. The idea that "management is 80% to 90% of the problem took awhile to sink in.... [But] understanding I was the biggest part of the problem also meant I was the biggest part of the solution," he says.

On the whole, IS organizations were not quick to latch onto Deming's ideas and to "get on the quality bandwagon," says James Weatherbe, director of the MIS Research Center at the University of Minnesota in Minneapolis and director of the Center for Cycle-time Research at Memphis State University. This began to change in the late 1980s, he says. The results have been better quality software and a growing focus on the needs of the end user.

Bose, for instance, has been moving from "activity-based" metrics (such as how many hours were spent on fixing a network) to "outcome-based" metrics (network uptime). The final strategy will be so-called "product out" thinking, in which quality is defined in terms of what each customer deems important.

Unfortunately, Deming and his ideas are still not as well known as they should be. Only one U.S. company, Florida Power & Light Co., has ever won a Deming Prize, an annual award for process improvement and managerial excellence established by the Japanese in 1951.

And although those in the IS field ought to be particularly receptive to the benefits of his ideas, many IS executives still know little or nothing about Deming's philosophy of using measurement and statistics as weapons against chaos and error.

In a world where management theories blow across the landscape like so many dust storms, Deming's ideas are still as relevant as they were 50 years ago.

Booker is *Computerworld*'s Chicago bureau chief.

Controlling the keys to the kingdom

Michael Schrage

Originally, this was going to be a column about the social impact of "ubiquitous encryption" — what happens to electronic mail and information sharing in an organization when data encryption is as cheap and easy as tapping an icon.

Then I figured, encryption was just a technical excuse to explore the broader topic of computer security. Shower people with locks, keys, safe deposit boxes and The Club and their behavior is going to change. Looked at that way, the issue becomes: How will proliferating network security technologies transform the way organizations communicate? And how should they?

Several hundred (wasted) words later, I unhappily realized that these questions missed the mark. Privacy, data integrity and information sharing are not defined by clever security regimes. And the usual cliches about "the need to determine what information to protect" don't touch the heart of the matter, which is politics. Network security isn't about hierarchies of protection; it's about hierarchies of power. The issue isn't "what" gets protected but "who."

Politically, putting high-powered security technologies (such as encryption) on the network is a little like replacing rubber bullets with real ones. The organization is begging for real trouble. Take a seemingly trivial example: your calendar. Lots of companies now wax enthusiastic about groupware that lets people coordinate their calendars via the net. Neat, but who gets what kind of access to the calendar you now have to post? Can just anyone view your calendar and request a meeting? Do they also get to schedule it? Can you block certain undesirables from scheduling meetings? Or can your boss — or that geek from legal — override a block and schedule you anyway?

> Network security isn't about protection; it's about politics and the pecking order.

Conversely, do you get to see your boss' calendar? Or are you but a mere scheduling supplicant in this brave new world of digitized calendar coordination?

In the good old days, of course, your secretary would say you were in a meeting. Or she would lie for you. Or you would say you didn't have your calendar with you. So sorry. Those days are gone. Scheduling software is becoming analogous to voice mail — you can no longer claim you didn't get the message.

So when someone logs on to the calendar, should he be surprised if he finds personal schedules filled with faux meetings and fake appointments to deter unwanted assignments? Digital deception may become the best form of calendar protection.

The rise of digital security inevitably sharpens the tensions between personal priorities and organizational imperatives. The potential complications make current network conflicts — such as who owns your E-mail — look trite. Encrypting personal correspondence is nifty, but negotiating the network protocols for who has access to your calendar is an issue people have to live with every working day. And the question of who gets to negotiate, from a position of strength is one that cuts very deep.

Encryption, public keys and access codes aren't about protecting organizational data. They're about the protection and distribution of organizational power. I think many organizations understand this all too well; they just want to protect their employees by restricting access to that dangerous bit of information.

Schrage is a fellow at the MIT Sloan School Center for Coordination Science and the MIT Media Lab. His Internet address is schrage@media-lab.mit.edu.

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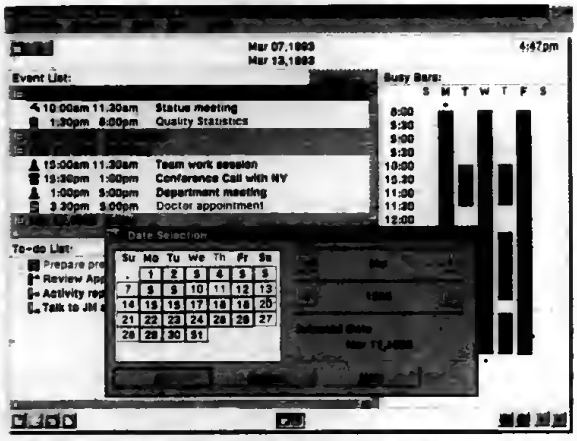

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Start-up paves alternate Visual Basic path

Vendors turn to InterGroup for VisualWare system

By Stuart J. Johnston

Microsoft Corp.'s announcement last summer that it will not license its Visual Basic Applications (VBA) Edition to other developers left independent software vendors in a quandary. Many worried aloud about how they could continue to compete with the software titan, and some even invoked accusations of unfair competition.

Now, however, a tiny start-up, InterGroup Technologies, Inc. in Bellevue, Wash., is offering developers another option that it says will give them all the advantages of VBA without the time and money required to develop their own VBA competitors. Without such an option, users who want the kind of cross-application macro language and live data-sharing capabilities provided by VBA would be locked into using Microsoft products, the company said.

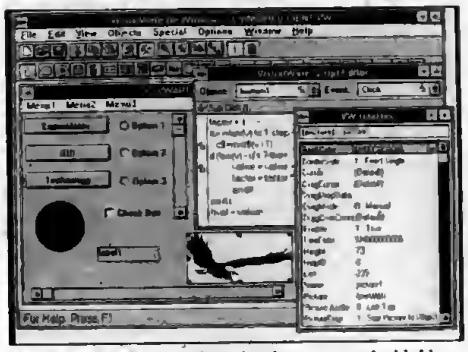
InterGroup will ship two new versions of its VisualWare development system in the coming months. An initial version shipped last fall.

The system offers developers an embeddable graphical user interface (GUI) development environment and a choice of Basic-based scripting languages that can be incorporated into their applications with a minimum amount of work, said Tom McKenna, company president.

Version 1.1, which is due out in the first quarter, will add support for Visual Basic custom controls, easily addable tools that are developed by third parties. Version 2.0, due in the second quarter, will add support for Object Linking and Embedding (OLE) 2.0 "container" objects, McKenna said.

Microsoft and most Windows developers view OLE 2.0 as key to the success of future workgroup computing in that it allows users to easily link and interchange data among off-the-shelf applications.

To provide the glue among OLE-enabled applications, Microsoft has developed two versions of Visual Basic, itself a commercial language development system that developers can purchase to write Windows applications.



VisualWare for Windows *offers developers an embeddable graphical user interface development environment and a choice of Basic-based scripting languages*

However, last summer the company also announced VBA, which it considers proprietary and which will be available only within Microsoft's own applications.

This leaves developers, especially smaller ones, facing the prospect of developing macro languages for their own applications that will tie into OLE 2.0 and can interact with Visual Basic and VBA code.

Relief for developers

That is where InterGroup's VisualWare comes in.

VisualWare provides a GUI-builder environment, accompanying development tools and Windows interface objects as well as on-line help.

InterGroup has negotiated deals to offer several scripting language options. These include the Softbridge Basic Language from Cambridge, Mass.-based Softbridge Microsystems, Inc. and Sum-

Start-up, *page 36*

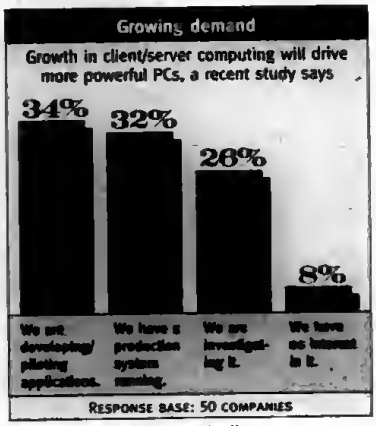
Client/server

Power-packed PCs in offing

By Michael Fitzgerald

The growth of the client/server market will drive a need for much more powerfully configured desktops, according to a new study.

Forrester Research, Inc. predicts that "super clients," a new class of desktop-based PCs, will develop as businesses continue to push mission-critical applications down to the desktop. These PCs, based on at least a 486-level processor, will also feature more RAM and hard-disk space to handle the amount of information they will process.



Source: Forrester Research, Inc., Cambridge, Mass

William Bluestein, a Forrester analyst, said super clients will become necessary because client/server computing will demand a higher level of reliability and security than today's desktop computing, "so you'll need a 32-bit operating system to start, and that will push memory requirements up."

More PC purchases

Bluestein added that linking multiple applications with potentially diverse database management systems will require more memory and processing capability.

Bluestein said the need for such super clients will spur a boom in corporate PC purchasing as companies move toward more distributed computing.

Super PC

A "super-client" PC includes a 486 chip, 32M bytes of RAM, a 200M- to 300M-byte hard drive and a 32-bit operating system with preemptive multitasking.

One major user agreed in principle with the study.

"Much of the installed base here is still some of the older technology, and to go to more enhanced client/server environments with more distributed processing, higher desktop power will be required," said Vaughan Hovey, director of information processing services at Eastman Kodak Co. in Rochester, N.Y.

Hovey said it was unclear, however, whether Kodak will buy more PCs than usual to meet its client/server needs.

OS/2 fixes, upgrade prepped for release

By Ed Scannell

By the end of the first quarter, IBM's Personal Software Products group will release a maintenance upgrade intended to fix hundreds of minor bugs in OS/2 2.1.

Currently in beta testing, the OS/2 2.1 Service Pack includes several incremental new features, such as support for a wider range of video boards and CD-ROM drives, although the release concentrates mostly on repairing annoying bugs.

System shutdown

"They are fixing bugs like the confusing prompts users get when they are shutting their systems down," one developer said. "So some users were shutting down their systems before they were supposed to, although I don't think anyone was losing any important data."

Loyal OS/2 users said they have been largely happy with OS/2 2.1 since its release last summer and have reported no data-threatening bugs. On the strength of Version 2.1, the installed base of the OS/2 2.x series topped the 4 million mark late last year.

All of the bug fixes and upgrade features contained in the Service Pack are expected to be rolled into OS/2 2.2, currently code-named Picard. Developers and beta users now expect that update to be available sometime in this year's third quarter.

IBM in the recent past has talked about the prospect of including various other capabilities in OS/2 2.2, including symmetrical multiprocessing and peer-to-peer networking.

However, no decisions have been made regarding what will be incorporated as part of the core program and what will be sold as add-ons.

One possibility seriously being considered internally, according to one IBM executive, is selling a core version of OS/2 2.2 through Personal Software Products' existing reseller and direct channels but making added capabilities available via CD-ROMs.

Last year, IBM's Software Manufacturing Co. introduced its CD Showcase that lets users try out, purchase and install various oper-

OS/2, *page 36*

Franco Vitaliano

Coming full circle

It's a new year and, therefore, a good time to reflect on where we are headed.

Unfortunately, in some cases, the drift seems mostly circular. Consider this puzzler: In this supposed new era of full-color, full-motion, CD-quality, multimedia digital convergence, why is it that handwritten ASCII text — which is basically what the Internet is — is suddenly such a techno-wonder?

It seems like there's a reality disconnect somewhere. In fact, in 1994 there is a high probability that the multimedia computer will turn out to be just an exotic mechanism that proliferates painfully handwritten memos.

Not gonna happen

And as long as we're talking about dead-end reasoning, I'd be willing to bet that some serious, well-intentioned information systems professionals will waste the better part of the year telling themselves (and upper management) that, given a little time, NT will be just as enterprise-able and well-connected as Unix. (Right now it runs Windows and MS-DOS about as well as Unix does PC insignia.)

We might also wind up back at square one with client/server computing. Although the client/server wave catapulted several successful software initial public offerings (IPO) in 1993, preliminary reports indicate that the combined Wall Street capitalization of all these newly IPO-rich companies does not even come close to what it will end up costing to implement client/server computing across Fortune 500 America. Mainframes are already starting to look like bargains.

Asynchronous Transfer Mode (ATM) also came in with much storm and fury last year, obscuring the fact that if we had a rational, nationwide set of tariffs on ISDN services, the dream of the digital highway would be here and now, rather than maybe the day after tomorrow.

This year will see a major market bloodletting between 100M bit/sec. Ethernet (whatever that means) and ATM. The upshot: By the end of this new year, your ASCII text E-mail will be arriving in your colleagues' burgeoning inboxes five seconds faster than it did in 1993.

No, in case you're wondering, not everything is staying the same or moving backward. . . .

At the end of 1993, the PowerPC, the new RISC chip from IBM/Apple/Motorola, saw the light of day. Which means that in 1994 Intel will face a major threat to its PC market hegemony. This will happen not because Apple will continue slashing its prices but because the trend toward truly portable PC operating systems will keep evolving. Gates & Co.'s Cairo, Chicago, Calamity, Conundrum, et al, will continue to appear on non-Intel chips.

IBM did two things right with OS/2 in 1993: One was technical, the other was in marketing.

First, it shipped Ferengi — no Microsoft code anymore; and second, it shipped Ferengi — no Microsoft code anymore. In 1994, the world will come to appreciate what IBM can really do with a complex operating system — in terms of both development and support.

What's Next?

Another operating sytem with big prospects is NextStep. Steve Jobs has dumped his proprietary hardware *and* promised to publish an open NextStep specification by mid-1994. That's already brought both Sun and HP around.

In 1994, NextStep may well emerge as the unifying force behind Unix (as opposed to CDE, COSE, OSF and the rest of the Sesame Street alphabet).

In 1994, IBM could surprise us and also announce that NextStep will run as a "guest OS" on its new operating systems. Such an announcement would, of course, finally bring *Fortune*'s infamous Jobs vs. Gates front cover story of several years ago full circle.

All in all, it looks like a good year, as long as you're not prone to dizziness.

Vitaliano is a principal at VXM Technologies, a Boston-based networking software developer

Start-up

CONTINUED FROM PAGE 35

mit Software, Inc.'s Embedded Basic for Windows.

This provides an integrated bundle of technologies that developers can easily integrate into their own code as well as a single point of contact for support, McKenna said.

InterGroup's competition, even for such a specialized niche, may be tough, however.

Most larger independent software vendors already have their own Basic-based macro languages that they are adapting to work with OLE 2.0 and Visual Basic. Some of those are bound to jump into InterGroup's market, said Brent Williams, director of PC software at International Data Corp. in Mountain View, Calif.

"Still, [VisualWare] is going to help small developers stay in the game," Williams added.

Cambridge, Mass.-based Lotus Development Corp. confirmed it is working on a VBA competitor that will ship in its applications in the next year, but the company currently plans to incorporate it only into its own products.

OS/2 fixes, upgrade

CONTINUED FROM PAGE 35

ating systems and applications from IBM and third parties.

This method of selling added capabilities for OS/2 2.2 enables Personal Software Products to better target the appropriate users for capabilities such as symmetrical processing or peer-to-peer networking. It can also significantly reduce marketing and manufacturing costs, making the product more price competitive.

"Right now we think this sort of approach makes a lot of sense for us and also may give users the built-in convenience of eliminating repeated trips to resellers to make software buys," the executive said.

With Windows 4.0 — a product Microsoft Corp. claims will run in 4M bytes of memory — looming on the horizon, Personal Software Products still appears intent on delivering a version of OS/2 that also runs with just 4M bytes of memory.

Personal Software Products officials had said they hoped to slipstream such a version into the market by the end of 1993 but failed to do so. It remains unclear whether OS/2 2.2 will be the much-awaited 4M-byte version.

"We're not sure when [or if] we'll get to a 4M-byte version," one IBM executive said. "But over the next few months we'll continue making performance enhancements and trying to cut down the resource requirement," he said.

Big PC makers got bigger in 1993

By Michael Fitzgerald

The U.S. PC market grew like a proverbial weed in 1993, up 25.8% over 1992's robust totals, according to year-end projections from International Data Corp. (IDC).

Some 14.8 million PCs were sold in the U.S. market, compared with 11.8 million in 1992. Worldwide, PC hardware unit shipments rose 18.8%, from 30.4 million to 36.1 million units, IDC projected. Both U.S. and worldwide numbers outstripped projections from early 1993.

Richard Zwetchkenbaum, an analyst at IDC, said a stronger-than-expected worldwide economy and vendors' aggressive moves into new markets fueled the unexpected growth.

"There was strong demand from all quarters, including the home market and the U.S. government with its Desktop IV contract kicking in," Zwetchkenbaum said.

IDC projects that growth will slow in 1994, with worldwide sales up 12.4% to 40.6 million units and U.S. sales up 10% to 16.3 million units. Color notebooks and subnotebooks will spur this growth, as will new 32-bit applications.

Notable in IDC's findings were the following:

- The market continued to consolidate, with the Top 10 vendors controlling 64.1% of the market, up from 52.9% in 1992.
- Compaq Computer Corp. topped the growth charts with a 95.8% unit spurt worldwide, 109% in the U.S.
- Overall worldwide No. 1 IBM PC Co. reclaimed its No. 1 position in the U.S., nudging out Apple Computer, Inc. by 25,000 units.
- Commodore Business Systems, Inc. was the only vendor in the Top 10 to see unit growth drop, falling 35% to less than 1 million units, as the company slumped from No. 4 to No. 8 worldwide.

Bull market

1993 was a very good year for PC makers, with 25.8% overall market growth

Top 10 vendors, branded worldwide PC shipments, 1993

1993 Rank	1992 Rank	Vendor	Projected 1993 unit shipments	1992 actual unit shipments
1	1	IBM	[illegible]	[illegible]
2	2	Apple	[illegible]	2,760,000
3	3	Compaq	[illegible]	[illegible]
4	5	NEC	[illegible]	[illegible]
5	7	Dell	[illegible]	670,000
6	6	Packard Bell	[illegible]	685,000
7	9	AST	[illegible]	[illegible]
8	4	Commodore	937,000	[illegible]
9	8	Toshiba	750,000	690,000
10	12	Gateway 2000	670,000	437,000
		Total PC Shipments	[illegible]	[illegible]

Source: International Data Corp., Framingham, Mass.

Briefs

Gateway bundles with modems

Gateway 2000, Inc. said it would bundle Traveling Software, Inc.'s Commworks integrated communications package with every modem it ships, including those installed in systems.

Compaq's distributor list grows

Compaq Computer Corp. added Ingram Micro, Inc. to its list of distributors.

Database for Unix systems debuts

Leading Market Technologies, Inc. in Cambridge, Mass., has launched TickBase, a database management system offering for Unix systems that stores real-time data taken from financial market sources. Meanwhile, Morgan Stanley & Co. has acquired a site license for Leading Market Technologies' Expo real-time spreadsheet.

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Job Search may open Uncle Sam's doors

Database holds thousands of listings for federal government positions

By Gary H. Anthes
WASHINGTON

Anyone looking for a job in the federal government might enlist the help of Job Search Express, a PC-based software package from SAK Consulting in Reston, Va.

The software comes with a database of more than 2,000 government job openings in 1,100 specialties, ranging from "able seaman" to "zoologist." Because the database is local — data diskettes cost $10 and downloads from SAK's bulletin board cost $5 — users pay no connect or usage charge.

The $29.95 package allows users to search for job openings based on job type, pay range and/or geographic preference. Items that meet the user-specified criteria may be sent to a screen or printer. In addition, a form may be printed for ordering database updates.

SAK updates its database twice a week by downloading data from about 10 federal electronic bulletin boards around the country, said President Scott Keen. SAK is seeking additional sources for its job data and may add information about state and local government openings, he said.

Rapid response

A reporter trying Job Search Express found the software extremely easy to use; no documentation was needed. Pressing the F1 key at any point brings context-sensitive help and F2 displays "pick lists" — tables of job and pay codes, for example — to choose from when building job search queries.

Most queries tried on an Intel Corp. 1486-based PC returned results in less than a second.

However, as slick as the software is, limitations in the data may mean that not all users will find their dream jobs using Job Search Express. A query seeking openings for secretaries in the Washington area turned up only 15 items at places such as the National Endowment for the Arts, the Smithsonian Institution, the National Park Service and the U.S. Department of State — surely a tiny fraction of the openings for secretaries here.

And a search for computer-related jobs using the code for "information specialist" as the search criterion turned up several cryptic notices of openings for "correctional assistants." A search using the code designated for "computer specialist" found 19 openings, but they contained no job descriptions indicating whether the agency was seeking a programmer, analyst or chief information officer. Salary ranges were indicated, however.

Other searches found "openings" that were nothing more than generic notices from the Federal Office of Personnel Management stating that job seekers should directly contact the agency for which they wish to work.

Keen said Job Search should be viewed as a tool for generating job leads. He said in most cases users will want to telephone the numbers given with leads retrieved from the database and request that detailed job descriptions be sent to them by mail or fax.

Poet Software Corp. has announced Poet 2.1, an object database system.

According to the Santa Clara, Calif., company, the product provides functionality and performance improvements and features the Poet Professional Edition for Microsoft Corp.'s Windows for Workgroups, a 16-bit Windows offering.

A 32-bit implementation for Microsoft's Windows NT is also available.

Poet 2.1 features additional database language syntax that allows a database designer to specify complex and compound indexes, an improved query optimizer, faster index management and faster low-level file I/O.

Pricing starts at $499.

▶ *Poet Software*
(408) 748-3403

Zebra Express has introduced Zebra Express, an accounting system for Windows.

According to the Tampa, Fla., company, the product is a complete multiuser, eight-module system that includes Accounts Payable, Accounts Receivable, Fixed Assets, Inventory and Purchase Orders.

Zebra Express offers consolidated and multidivision reporting from the General Ledger module, automatic calculation and tracking of sales commissions from the Accounts Receivable module; check printing individually and in batches from the Accounts Payable module and multiple inventory classifications in the Inventory Control module.

Zebra Express will be available for $99 until the end of March. The suggested list price is $795.

▶ *Zebra Express*
(813) 888-7500

Manzanita Software has added Order Entry and Inventory Control modules to its line of BusinessWorks for Windows accounting software products.

According to the Roseville, Calif., company, BusinessWorks for Windows Inventory Control maintains complete information for each inventory part, including vendor, on-hand and on-order quantities, components, substitute items and transaction history.

The Order Entry module tracks orders from order placement through shipping and invoicing.

General Ledger, Accounts Payable and Accounts Receivable modules are also available.

Each module costs $295.

▶ *Manzanita Software*
(916) 781-3880

Ocean Isle Software, Inc. has introduced Version 4.0 of ReachOut Remote Control, a remote control program.

According to the Vero Beach, Calif., company, a suite of utilities is provided for both Windows and DOS applications.

The product also provides full support for high-resolution monitors and TCP/IP.

Modifications to any of the Windows systems files is not required.

ReachOut Remote Control costs $179. The network version is priced at $295.

▶ *Ocean Isle Software*
(407) 770-4777

Austin Computer Resources, Inc. has introduced Buy the Hour, time and billing software for Windows.

According to the Greenwich, Conn., company, the program was designed to easily tabulate time and associated fees through the use of time sheets.

The product features ease of customization to any practice, detailed work descriptions, time sheet entry, extensive tracking, simplified bill processing and multiple billing rates.

Buy the Hour costs $125.

▶ *Austin Computer Resources*
(203) 532-1110

Caere Corp. has added CardScan business scanning software from Corex Technologies Corp. to its handheld scanning product, OmniScan for Windows.

According to the Los Gatos, Calif., company, OmniScan integrates scanning functions that include image capturing and editing, fax and optical character recognition capabilities with a grayscale scanner.

CardScan reads and stores each card and can identify various fields on business cards and put them into an address book.

Users can perform free-form searches through address books with CardScan. The application also includes autodial, Smart Zoom features.

The Windows version of OmniScan with CardScan costs $449. CardScan is also available directly from Corex for $74.95.

▶ *Caere*
(408) 395-7000

Scientific Programming Enterprises has introduced Version 3.2 of PlotIt for Windows, a graphing and numerical analysis program.

According to the Haslett, Mich., company, this version offers a number of interface and data manipulation features that provide users with additional control over the process of graphing numerical data.

PlotIt is a 32-bit application that runs under Microsoft Corp.'s Windows 3.1, Windows 4.0 and Windows NT. In addition, the program supports Object Linking and Embedding 2.0.

The product offers a Graph Group Selection command that enables users to plot automatic multiple curves directly from a worksheet.

PlotIt Version 3.2 costs $495.

▶ *Scientific Programming Enterprises*
(517) 339-9859

Looking Glass Software, Inc. has introduced MediaVerse, an advanced multimedia authoring environment.

According to the Inglewood, Calif., company, the product was designed for the creation and playback of full-color interactive presentations.

MediaVerse joins database storage and media editing with interface design and playback. A Multimedia Database Builder, Interface Builder and Player for Windows and Macintosh are included.

MediaVerse can be used for applications such as trade show demonstrations, electronic magazines, CD-ROM titles, business graphics presentations, interactive documents and kiosk applications.

The product costs $799.

▶ *Looking Glass Software*
(310) 348-8240

Product shorts

PushButton Software, Inc. has introduced PushButton Works, an integrated Windows-based software package. The product offers five business applications in one program: spreadsheet, word processor, database with label and forms maker, charts and graphs, and report writer. More than 60 business, correspondence, personal finance and database templates are provided. Cost: $49.99. PushButton Software, Westboro, Mass. (508) 366-6939.... **Platinum Software Corp.** has introduced Platinum Treasury, a strategic tool that assists corporate treasury departments in managing financial risks. Features include reporting, comprehensive transaction processing, accounting functions, settlement and structured frameworks such as interest rate, foreign exchange, credit, liquidity and currency risks. Cost: $100,000. Platinum Software, Irvine, Calif. (714) 727-1250.... **Adobe Systems, Inc.** has announced Adobe Photoshop 2.5 software for Sun Microsystems, Inc.'s workstations. Users can manipulate scanned or computer-generated continuous tone, bit-map, grayscale or color images. Features include dodge and burn tools, a Quick Mask feature, broad graphics format support, collapsible palettes and a fast preview option to view adjustments. Cost: $1,895 to $13,495. Adobe Systems, Mountain View, Calif. (415) 961-4400.

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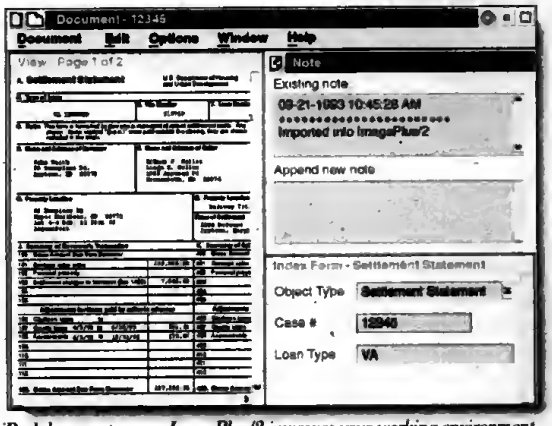

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—Telecommunications Corporation

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—Application Software Manufacturer

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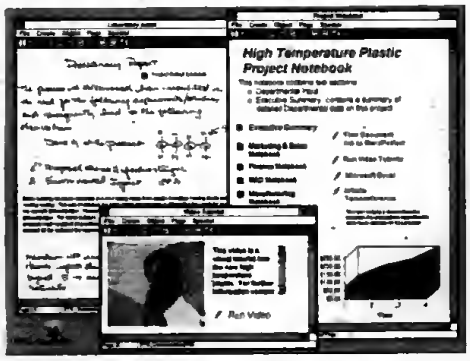
ForeFront challenges Notes with VNS

Real-time capabilities cited as major difference

By Michael Vizard

As Lotus Development Corp. gears up to deliver its first Unix implementation of Notes early this quarter, the industry's leading player in the groupware arena may soon find itself confronting some unexpected competition from the ForeFront Group, Inc. in Houston.



VNS' notebook metaphor *supports different data types*

Currently, the major technical difference between Notes, which uses store-and-forward replication technology, and ForeFront's Virtual Notebook System (VNS) is the real-time capabilities of VNS. As such, VNS can be used both as a repository for documents such as Notes and to provide users with the ability to share documents at the same time, according to Alexia Martin, principal at Intersections Consulting Group in Los Gatos, Calif.

"To really spark innovation, you have to have a visual representation of what you are talking about on the screen. There's a limit to what you can understand over the telephone," added Roger Turner, concurrent engineering manager at the Composites Automation Consortium in Burbank, Calif.

In the past, Lotus executives have said real time is not a major requirement for most groupware applications. However, Lotus is working on adding real-time capabilities to Notes in order to support videoconferencing.

Notes transformation

Meanwhile, Lotus has done more extensive work in terms of turning Notes into a platform for application development. "I don't see VNS as a platform for application development," Martin said.

In addition, according to Lotus, VNS is essentially one large repository that sits on the network and cannot be customized. Notes, on the other hand, is a better metaphor for letting individuals create databases locally, the vendor said.

Turner said he evaluated Notes to support an engineering team of eight people working at eight different companies in four time zones, but he opted for VNS because Notes lacks real-time capabilities.

"Notes has a lot of credibility. It just didn't suit our needs," he said.

VNS, *page 48*

Phone company to test competing groupware

By Michael Vizard

As part of a long-range plan to promote collaborative computing at an organization that stretches across five states, Southwestern Bell Telephone Co. plans to try out a real-time groupware offering that spans both PC and Unix platforms.

The Virtual Notebook System (VNS) from the ForeFront Group, Inc. in Houston is based on a real-time object database for storing documents that can be layered on top of either a SQL database or the ndbm database bundled in Unix. VNS makes use of a notebook metaphor as its user interface (see photo).

Southwestern Bell is in the early stages of trying to foster teamwork across an organization that is aligned horizontally, with specific teams responsible for complete business processes. Unfortunately, the need to organize and distribute information quickly to disparate team members has become a costly matter, said Russ Fisher, area manager for customer service in the information systems department at Southwestern Bell.

While flattening an organization speeds the flow of information, an increase in the number of meetings and endless conference calls serves to increase the cost of information, Fisher said.

"The need to collaborate based on teams and processes is becoming apparent as we move to become a horizontal corporation. It's become apparent that we needed something above electronic mail," he said.

Southwestern Bell decided to test VNS because it needed to find a solution that would support real-time collaborative computing across multiple client platforms using TCP/IP and an AIX server. "When we looked at other products such as Lotus' Notes, they weren't available on Unix or TCP/IP at the time. And Notes is very proprietary," Fisher said.

Database synchronization

VNS differs from Notes in that Notes uses bidirectional replication to keep Notes databases synchronized among multiple users, who communicate by storing and forwarding documents via E-mail.

In the VNS architecture, only one database resides on a server; it can be accessed in real time or asynchronously by systems running VNS client software that runs in native mode on Windows, OS/2,

Southwestern Bell, *page 46*

Legato promises cross-platform storage manager

By Stephen P. Klett Jr.

Legato Systems, Inc. said it will ship archival and hierarchical storage management (HSM) software by year's end as part of a data management services strategy aimed at providing a cross-platform software package for client/server networks.

NetWorker Archive and NetWorker HSM will be add-on modules to Legato's NetWorker backup and recovery software for Unix and Novell, Inc.'s NetWare environments. According to Legato, the software family will be independent of operating systems, hardware devices and media.

New flexibility

Industry observers said the product suite will give users a new level of flexibility over HSM systems from vendors such as Conner Peripherals, Inc. and Palindrome Corp., which are more proprietary in nature. For example, the software will run on users' current storage servers and backup devices so an additional hardware investment will not be required, they said.

"We don't think people are going to buy file migration and archival in a big way. They're not going to want to spend $15,000," said Louis C. Cole, president and chief executive officer at Legato. "Our approach will allow them to start small."

While exact pricing was not available, Legato said NetWorker Archive and HSM will follow the same pricing model as NetWorker. "Customers that paid, say, $6,000 on NetWorker for data management can expect to pay $6,000 for HSM," Cole said.

NetWorker Archive writes multiple copies of backed-up data to separate media, which allows users to delete files and free up space on their servers or hard disks. A version for Unix is slated to ship in the third quarter, and a version for NetWare is scheduled for the first quarter of 1995.

Managing data

According to Peripheral Strategies, Inc. in Santa Barbara, Calif., companies spent an average of $337,000 to manage their data last year, not including the cost of hardware expansion.

NetWorker HSM provides migration and data staging from hard disk to tape based on rules set by the systems administrator. It is slated to ship in the fourth quarter for both Unix and NetWare.

Attractive approach

Several analysts have said Legato's modular approach may make its product more attractive to users wary of early software releases and turned off by the hefty price tags typically associated with HSM systems.

Information systems "managers are resistant to implementing Release 1.x of anything," said Bob Abraham, vice president at Freeman Associates, Inc. in Santa Barbara, Calif. "They are especially resistant to adding something as unproven and complicated as an HSM system to their network." However, he said Legato's modularity and hardware independence may help users take the HSM plunge by allowing them to get into the technology slowly at a reasonable cost.

Legato's data management services architecture consists of the following components:

- **Storage management engine:** Software that separates archive and backup data, maintains catalogs of managed data and media library catalogs; storage management applications function independent of network protocols.
- **Applications layer:** Consists of backup and recovery, archival and HSM modules.
- **User interface:** Provides a common view of storage management data residing on the network.

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IBM hits the electronic forms scene

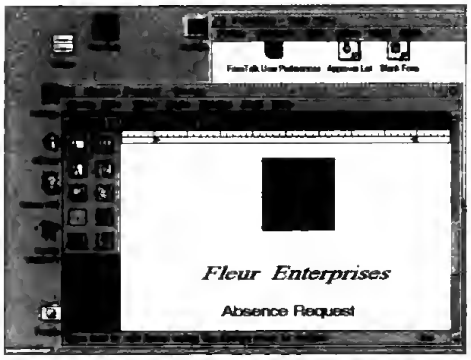
By Michael Vizard

As large-scale implementations of electronic mail on PC LANs become more stable, the industry's larger vendors have begun shifting their focus to marketing applications that rely on mail as a delivery vehicle

For example, IBM is about to ship an electronic forms and work-flow software package called FormTalk that will make use of IBM's object-oriented WorkPlace Shell on OS/2. Meanwhile, Lotus Development Corp is expected to deliver Lotus Forms for Notes in the first quarter, and both WordPerfect Corp and Microsoft Corp jumped into this market last summer.

In addition to these companies, smaller ones such as Delrina Corp in Toronto and JetForm Corp. in Waltham, Mass., have already established themselves as suppliers of electronic forms and work-flow software on multiple platforms.

"People are starting to realize that you can use electronic mail for more than just sending messages. They now have the infrastucture in place to build these kinds of applications," said David Ferris, president of Ferris Networks, Inc in San Francisco



FormTalk *simplifies design using WorkPlace Shell in OS/2*

IBM expects to differentiate itself from other suppliers in this market by delivering a FormTalk offering that is intended to enable end users to easily design their own forms, according to IBM brand manager Paul Clandillon

Users create forms

To accomplish this, users can manipulate icons using the WorkPlace Shell in OS/2 to create forms and to design the actual work-flow paths for a form. In contrast, Clandillon said, electronic forms packages for Windows require developers to create the forms and design the work-flow paths. "We don't require that users have programming skills to create a form," he said

However, Clandillon said IBM plans to market a Windows version of FormTalk in 1994, which will require it to make compromises because Windows does not provide an object-oriented shell similar to the WorkPlace Shell.

FormTalk will use the administration services of any mail system that complies with the Vendor Independent Messaging specification. It will be available for general release in 60 to 90 days, priced less than $150 per user

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Server boosts upcoming

By Stephen P Klett Jr

Analysts said first-quarter 1994 will be a hectic period for server vendors as they scramble to release products to compete with Compaq Computer Corp.'s ProLiant.

"From a cost, feature and ease-of-use standpoint, Compaq has shaken things up quite a bit with ProLiant," said Randal Giusto, an analyst at WorkGroup Technologies, Inc., a consultancy in Hampton, N.H. Giusto said users can expect to see several major vendors come out with two- and four-processor systems at aggressive price points to compete with ProLiant

"End users can expect servers from most vendors at the same price points as their current lines with at least a [two-fold] increase in performance," he said.

"Users will start to see features reserved for high-end machines — such as multiple processors and fault tolerance — appear in the lower end, more basic machines, such as Compaq has done with ProLiant," said Tom Kucharvy, president of Summit Strategies, Inc. in Boston "NetFrame and Tricord supply the same capabilities but at much higher prices," he said

The most notable server developments analysts said they expect during the next year include the following

• First quarter: Digital Equipment Corp. will come out with systems replacing its ST server line. IBM will refresh its PS/2 Server 195 and 295 server families, and Compaq will revamp Prosignia. NetFrame will ship a symmetric multiprocessing (SMP)-based superserver to run Microsoft Corp.'s Windows NT.

• Midyear: Systems based on Intel Corp.'s new Peripheral Component Interconnect chip set will appear. IBM will ship its SMP version of OS/2.

• Dual-processor machines, which are needed to run SMP-based operating systems such as Windows NT and SMP OS/2, will become standard.

They get the squeeze

Kucharvy said the appearance of relatively low-cost, Intel-based multiprocessor machines from the likes of Compaq, NCR Corp. and Sequent Computer Systems, Inc. would put a squeeze on the superserver vendors.

These vendors will be forced to either drop prices significantly or migrate their systems upward to compete with high-end machines in the Unix market from companies such as Hewlett-Packard Co and Sun Microsystems Computer Corp.

Analysts agreed that IBM has the most work to do, saying the company has fallen behind competitors in nearly every segment of the market. "IBM absolutely has to do something major with SMP at 95 price levels to go head-to-head with Compaq," Giusto said.

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Southwestern Bell

CONTINUED FROM PAGE 41

a Macintosh client or any X Window System client. Access to a particular database, which can handle a wide variety of multimedia data types, is coordinated using standard database-locking procedures.

Southwestern Bell has 25 users using VNS to do project management, but Fisher said he expects that number to increase as the firm moves to adopt a more horizontal organizational structure.

"VNS is a very open, very unstructured environment. We can scan things into the VNS library or cut and paste data from a Profs message directly into the VNS server," Fisher said.

Fisher said that thus far he has been able to create an environment that allows users to open multiple documents on the VNS server and cut and paste across those documents. Users can also easily cut and paste data between any application and the VNS server.

That latter capability is particularly important in the context of VNS' real-time capability, which Southwestern Bell uses to provide users with document conferencing capabilities.

"As you move to a horizontal organization, you'll see a lot more electronic mail and phone calls across the organization. VNS allows us to cut down on the amount of travel that has to be done across the different cities in the states we cover," Fisher said.

In the long term, Fisher said, he expects to incorporate VNS directly into Southwestern Bell's Asynchronous Transfer Mode and frame-relay networks to use VNS in conjunction with real-time video and audio applications. At the same time, the ForeFront Group is beta testing a version of VNS that supports Microsoft Corp.'s Object Linking and Embedding (OLE) 2.0 technology. The ability to use VNS as an OLE 2.0 container is expected to arrive by the end of this quarter.

"VNS is easy to use, and I can train someone to use it in about three hours. There are not a lot of tool-bars and icons," Fisher said.

VNS

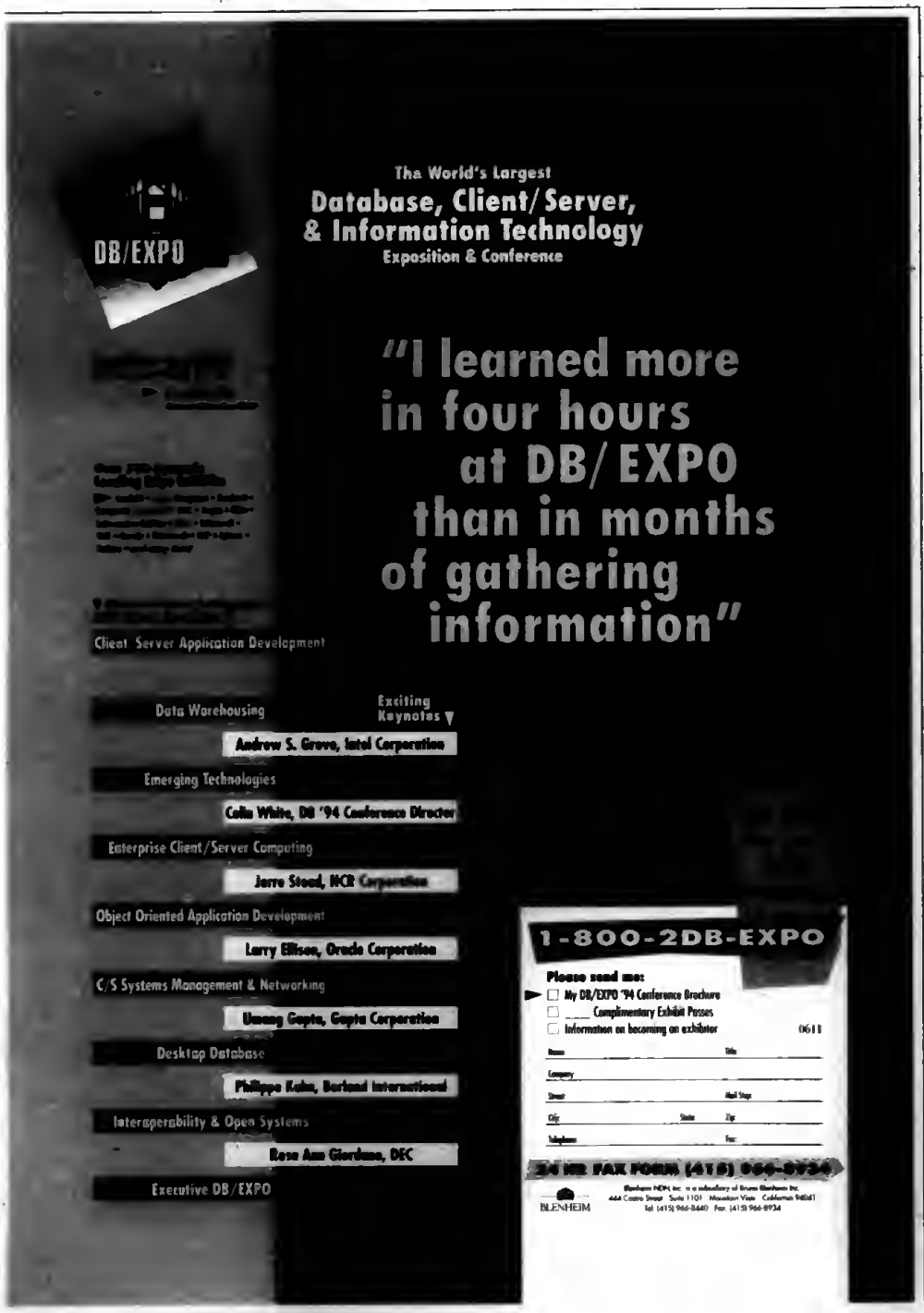
CONTINUED FROM PAGE 41

At the core of VNS is a Real-Time Object Manager (RTOM) that manages an object database for storing documents. Linked to RTOM is a set of application programming interfaces written in C that allow client applications to call data from the RTOM server.

RTOM was originally developed at Baylor College of Medicine in Houston based on research done by Dr. G. Anthony Gorry, who is now vice president of graduate studies, research and information systems at Rice University in Houston. Today, VNS has been adopted at a range of companies, including MCI Communications Corp., British Petroleum Co., Shell Oil Co., The Dun & Bradstreet Corp., 3M Co., Lockheed Corp., McCormick & Co. and the University of Chicago.

VNS supports all major Unix platforms, with support for Microsoft Corp.'s Windows NT and Novell, Inc.'s NetWare forthcoming. Pricing for VNS is $595 per Windows and Macintosh client. X Window System clients are priced at $795. A VNS server license costs $6,000.

In contrast, Notes has a lower price of $495 for both clients and servers. It currently runs on OS/2 servers, with support for Solaris 4.1 servers from Sun Microsystems, Inc. due shortly. Support for Novell's NetWare Loadable Module architecture is due next month, while implementations on other Unix platforms and Windows NT are due in the first half of the year.



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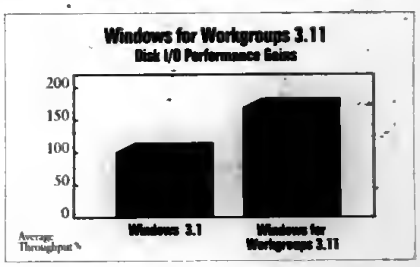

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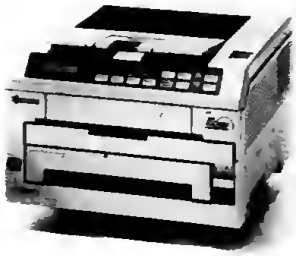

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Workgroup Productivity Corp. has announced Note-able Tools for Notes 3.0.

According to the Oak Brook, Ill., company, the product provides corporations with the guidelines they need to implement and develop Notes on a corporate-wide basis.

Applications such as the Methodology and Standards Guidelines, Implementation and Roll-out Guidelines, Design Element Repository, Design Element Encyclopedia, Extended Formula Catalog and Application Quality Assurance Certification are included.

Note-able Tools costs $4,995 per domain and $295 per developer.

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ICL has introduced Version 3.0 of its TeamOffice groupware product set.

According to the Irvine, Calif., company, the most significant enhancement to Version 3.0 is TeamFlow, a work-flow application that integrates seamlessly with Windows applications, TeamMail and other TeamOffice modules.

Version 3.0 also offers Microsoft Corp.'s Windows NT support, forum support for X.400 addresses for senders external to TeamOffice, a Windows interface for asynchronous dial-up client connection and support for Windows for Workgroups' Microsoft Mail client using a TeamOffice back end.

TeamOffice Version 3.0 costs $495 per user for a 10-user starter license.

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Sapiens International Corp. N.V. has announced that Version 1.2 of Sapiens Vision, an object-oriented tool for rapid development of client/server applications, is available for IBM's AIX Version 3.2, Digital Equipment Corp.'s OpenVMS Version 5.1 or higher and Ultrix Version 4.2 and Sun Microsystems, Inc.'s SunOS 4.1.x.

According to the Cary, N.C., company, Sapiens Vision 1.2 allows users to create applications that can be developed on and ported to any platform supported by Vision without requiring conversion or recompiling. Users are able to build client/server applications with the provided graphical user interface, client processing and server.

Enhancements include 100%-improved SQL performance from within SmartGL, the ability to open Windows 45% faster and help buttons that let users access context-sensitive, on-line help for specific messages and fourth-generation language syntax.

In addition, the development environment and entire Sapiens Vision applications can be launched with start-up files.

Sapiens Vision is priced at $8,000 per developer.

▶ *Sapiens International*
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Intergraph Corp. has introduced EMS 3, an Engineering Modeling System (EMS) family of computer-aided design, engineering and manufacturing software products.

According to the Huntsville, Ala., company, EMS 3 provides high-performance, variational solid modeling with a range of integrated product development applications.

EMS 3 has the ability to automatically convert nonvariational geometry to fully constrained variational profiles. It also provides mechanical computer-aided engineering software that offers simulation tools for finite element analysis, mechanical systems analysis and plastics injection-flow analysis as well as tools for numerical control programming and fabrication.

Pricing for design seats of EMS 3 starts at $9,900.

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EICON TECHNOLOGY

NetLabs takes off

Company readies distributed platform

By Lynda Radosevich

■ NetLabs, Inc., which landed SunConnect as a technology partner last month and NCR Corp. as a partner earlier last year, is looking more like a force to watch in the network management world, according to users and analysts.

At the heart of the recent deals is NetLabs' distributed object-oriented network management platform, Dimons 3G. It is software that gives an operator access to alarms and statistics generated by "agent" software in devices on the network. The agents can be compliant with the Simple Network Management Protocol, Common Management Information Protocol standards or NetLabs' proprietary agent technology.

NetLabs offerings

Network management platforms are only part of the management picture. NetLabs also offers the following applications:

- **NetLabs/Discovery:** Records topological information in time-stamped snapshots.
- **NetLabs/Assist:** Creates reports and graphs, dispatching service requests and preconfiguring alarms.
- **NetLabs/Service Desk:** Maintains profiles on networked devices for tracking problems.
- **NetLabs/AssetManager:** Finds and tracks hardware and software resources.
- **NetLabs/Vision DeskTop:** Provides real-time status of desktop components on network.

Dimons 3G employs distributed technology that lets users access information from any part of the network. Without distributed management, operators are tied to specific workstations where the information is collected, said Rosalie Buonauro, vice president of marketing at NetLabs, which is based in Los Altos, Calif.

Dimons 3G works using a system of "cooperating kernels." A kernel is the server software that collects and distributes information. Each network device, such as a router, has an object name stored in the kernel's directory that can also be shared and distributed. That object-oriented distributed model means network operators can get information on any object from anywhere in the network.

Analysts agreed that Dimons 3G's distributed technology is between nine months and two years more advanced than platforms from market leaders Sun Microsystems, Inc., Hewlett-Packard Co. and IBM.

"They are the first to market, but we'll see how it compares when the others catch up," said James Herman, vice president of Northeast Consulting Resources, Inc. in Boston.

Almost there

Actually, Dimons 3G is not on the market yet. End users can obtain the product (called Overlord when NetLabs announced it last February) only through value-added resellers and systems integrators. That is because it still requires a great degree of configuration.

However, NetLabs will offer by midyear an "out-of-the-box"-ready version, complete with preset alarms, preloaded management processes and access-control security options, according to Buonauro. That release coincides with SunConnect plans to release a distributed platform based on NetLabs' technology.

Both will share a common high-level, object-oriented application programming interface. What will differentiate the product lines is that Dimons 3G is not tied to a specific hardware platform. Now it is available only on Sun OS and Solaris-based workstations, but NetLabs plans to port it to NCR and Siemens/Nixdorf Information Systems, Inc. hardware within 12 months, Buonauro said.

After releasing the midyear version, NetLabs will focus on speeding up performance and increasing the number of users that can simultaneously access the system. The current number is about 25.

NetLabs' 18- to 24-month goal is to enable end users to look into the network through a Windows interface to see how it is behaving. If a messaging server will be down for three hours, users should see that and plan accordingly. The goal is to reduce support costs by letting end users "be part of the management solution," Buonauro said.

University tears down its information walls

By Elisabeth Horwitt

The University of Michigan is tying together its heterogeneous client/server installation using services based on the Open Software Foundation's Distributed Computing Environment (DCE) and the X.500 directory. This is despite the fact that vendor support for both standards is still sparse at best.

At stake is the Ann Arbor, Mich., university's Future Computing Environment, launched a year ago, that aims to provide users and mission-critical applications with the same reliability, security and transparent access to resources they now "know and love on the mainframe," said Larry Gauthier, manager of the technology assessment group at the university's Information Technology Division.

Some 37 subgroups in that overall project are working on a suite of services based on DCE, Distributed File System and X.500 directory protocols that will run across the university's client/server environment. The services will include naming, directory, file storage, network access, remote dial-in, electronic mail, security, authentication and file storage.

Cost not key

The project is not expected to realize any cost savings. Rather, "we have to bring down some of those walls of noninteroperable technology that today involve manually rekeying batch file transfers, tapes and disks," Gauthier said. "We want to take the data that already exists in computers and turn it into information for our users so that they can get the job done, whether they are an administrator or a student."

The architecture will also allow anyone with access rights to plug into any services available on any platform and in any department in the university, Gauthier said.

This will potentially offer greater cost efficiencies by enabling, for example, the billing and accounting department to provide its services through a server it maintains in its own area, Gauthier said. Currently, information technology must maintain billing and accounting services on the mainframe.

ON SITE

University of Michigan
Ann Arbor

Challenge: To give users in a distributed environment mainframe-like access, reliability and security.

Technology: The U-M's Distributed Computing Environment.

Goal: To bring down the walls surrounding central computing environments.

In addition, the DCE architecture will support the delivery

University, page 53

David Michael Bernard

Peer-to-peer smears

"That is a *peer-to-peer* network."

The networking profession could not conjure up a more derogatory description for a network operating system. The mere suggestion that a system design involves peer-to-peer networking is enough to nix it. Go ahead, ask your neighborhood networking wizard why peer-to-peer networks are not used in your office. He or she may offer one of the following explanations:

"They are too slow."
"They are not secure."
"They do not integrate with other systems."
"They smell."

In short, the consensus is that peer-to-peer networks lack critical features and/or capabilities that exist in full-blown systems such as NetWare or LAN Manager. Systems such as NetWare provide network managers with much-desired centralized security and network management. Resource sharing is focused around the use of a file server. Node resources cannot be shared — only server resources can be shared.

Disappearing differences

What then is a peer-to-peer network? Webster's defines *peer* as "one that is of equal standing with another." The original peer-to-peer networks were true to this meaning — a network where all nodes have the ability to access one another's resources. There was a distinct difference between "peer-to-peer" and client/server — the absence of a server. This is not the case anymore.

We are beginning to witness a convergence of feature sets between peer-to-peer and client/server. Client/server network vendors are incorporating peer-to-peer functionality into their flagship product lines. When users share printers on a Novell LAN using RPRINTER, they are sharing node resources and are, therefore, using peer-to-peer functionality. Control-hun-

Bernard, page 52

Niche gateways draw new customers

By Thomas Hoffman

While sections of the nation's information superhighway are still being paved, some entrepreneurs have opened service roads and private toll booths to help their organizations draw prospective riders and revenue.

For example, Coopers & Lybrand, a New York-based Big Six accounting and professional services firm, launched an electronic tax information service last May to corporate tax directors and chief financial officers called the Tax News Network (TNN). TNN, which bundles electronic versions of "must-read" daily tax periodicals such as *Tax Notes Analyst* and *Commerce Clearinghouse*, has already drawn 450 subscribers from 200 Fortune 500 companies, including Johnson & Johnson, AT&T, Merck & Co. and Goldman Sachs & Co., according to Andrew B. Zimmerman, national information industry partner at Coopers & Lybrand.

Coopers & Lybrand's Andrew B. Zimmerman: *TNN's incentive is to attract nonclients*

TNN subscribers, who can be connected to the network through PC modems or LAN gateways, can choose from four information channels on the DOS-based system: federal tax law, state and local tax law, international law and employee benefits. In addition to daily news summaries of developments in each tax field, TNN provides electronic access to a range of third-party and Coopers & Lybrand newsletters, as well as on-line access to Coopers & Lybrand tax experts.

Profit not part of plan

Although TNN's $50 monthly fee has thus far generated hundreds of thousands of dollars in new revenue, Zimmerman said the service was not targeted as a profit-making vehicle for the accounting firm.

"The real incentive is to get current clients to do business with us and to get nonclients interested in our services," Zimmerman said. Indeed, one-third of TNN's installed base are nonconstomers, and with daily access to its tax experts, the odds of Coopers & Lybrand landing business with new customers increase.

TNN was developed using base platform technologies from Reach Networks, Inc., a $3 million, privately held New York-based firm that develops simplified DOS- and Windows-based front-end communications packages. That approach has helped Reach clients such as Coopers & Lybrand land novice PC users as TNN subscribers.

"The corporate tax crowd is not technologically oriented," said William P. Kane, Reach's chairman and chief financial officer. "We knew that most of these people had PCs, but we hadn't realized how PC-illiterate they were."

Reach is developing a Windows-based version of TNN, slated for release this month, Kane said.

Reach's David Johnson: *Counsel Connect has gained 3,000 users from 85 top law firms*

Reach also helped customize a niche-oriented network for another nontechnical industry group, American Lawyer Media. Counsel Connect, which began last April, was designed to act as an electronic meeting place for lawyers at the nation's Top 100 law firms and major corporate legal counsel at Fortune 500 companies.

The network, priced at $9 per month per user (not including connect time charges), was designed as a forum for lawyers to generate topic discussions on specific legal issues such as intellectual property. But perhaps the most important attribute of the network is that it allows corporate legal counsel to interact with and procure services from major law firms that specialize in particular legal jargons, such as age discrimination litigation.

Reaching out

For example, Counsel Connect has helped McCarter & English, New Jersey's largest private law firm with 200 attorneys, extend its reach to new clients in other parts of the U.S., said Charles R. Merrill, a partner at the Newark-based firm and a charter Counsel Connect user.

"The service has led to a few accounts with customers and conversations that will bear fruit in the future," said Merrill, who is chairman of his firm's computer and high-tech law practice group.

So far, Counsel Connect has garnered 3,000 users from 85 of the Top 100 U.S. law firms and 500 corporate customers, including General Electric Co., Kraft General Foods and Storage Technology Corp., according to David R. Johnson, president and chief executive officer at the New York-based electronic service.

In fact, Counsel Connect has been adding 200 users to the network each week, with an ultimate goal of placing 100,000 IDs on the system.

Bernard

CONTINUED FROM PAGE 51

gry network managers using Intel LANSight or LANDesk to view and/or operate nodes remotely are using peer-to-peer functionality. Peer-to-peer functionality is very useful and definitely has a place in all networking systems.

And that's not all. Peer-to-peer networks are starting to take on more client/server functionality. Nodes can be configured as servers, allowing resource sharing without taxing node performance. Centralized administration and security are now offered in many products. And don't let anyone persuade you that network communication on peer-to-peer systems as a group is inferior to client/server systems. NetWare Lite uses the same IPX/ODI as NetWare 3.11, just as Windows for Workgroups uses the same NDIS/NetBEUI as LAN Manager.

In terms of network operating systems, it is best to understand peer-to-peer and client/server as feature sets, not network types. The functionality of a network operating system can be a subset of one or a union of both.

Now don't get me wrong, when compared to peer-to-peer systems, NetWare still maintains a performance advantage with its 32-bit proprietary server operating system. But how much of an advantage? If the node count is low and use is not excessive, this may not matter. And with 32-bit desktop operating systems on the horizon, 32-bit server technology may become an option for peer-to-peer systems.

What does this mean to the end user? The belief that peer-to-peer is a technically inferior network operating system has influenced many smaller companies to overpurchase in their acquisition of systems. Many companies that purchased NetWare could have saved a significant amount of money by selecting a so-called peer-to-peer network operating system. What's more, nothing would have been sacrificed

The only way to wisely select a network operating system is to match needs to the features of the products under consideration. If a need is not met by the product in question, it should be rejected. But that product will not necessarily be a "peer-to-peer" product.

Bernard is a technology management consultant at Omicron Consulting in Philadelphia.

Briefs

ATM deal

Hughes LAN Systems and **Wellfleet Communications, Inc.** have signed an agreement to jointly develop products that integrate routing, switching and Asynchronous Transfer Mode technologies in the Hughes Enterprise Hub.

X.400 hub gets client

Control Data Systems said it will ship this month standards-based end-user software for use with its X.400 messaging and X.500 directory hub. Control Data licensed the software, which includes electronic-mail, directory and scheduling user interfaces from Enterprise Solutions Ltd.

Frame relay gets green light

The **Frame Relay Forum** agreed on a technology that should improve frame relay's performance as a wide-area transport mechanism in multiprotocol networks. The agreement standardizes the way frame relay transports or encapsulates the various protocols in a field, shielding the protocols from network interpretation until they get to the terminating router or bridge.

Motorola denies tumor claim

Trying to stamp out a growing perception that cellular phones can cause cancerous tumors, **Motorola, Inc.** issued a press statement last week saying an employee's recent lawsuit is groundless and that various studies have found that Motorola employees are healthy and less cancerous than U.S. averages.

MCI promotes lite

MCI Communications Corp. is offering a simplified "lite" version of its DOS-based MCI Express Mail free to new MCI Mail subscribers.

Telecom mergers

The recent wave of mergers that has swept the U.S. telecommunications scene will continue for several years, according to a report from **Insight Research Corp.** in Livingston, N.J. The report projects 10% compound annual growth in the newer segments of the local communications market — cable TV, cellular radio, wideband and wireless services — through 1998, compared with 3% in traditional telephone services. That growth in new services is driving regional telephone companies to acquire or pair with organizations such as cable TV providers.

Frame-relay support

Frontier Software Development, Inc. has announced support for frame relay on its NETscout Model 6040 WAN and 6050 LAN/WAN probes for managing network traffic.

University

CONTINUED FROM PAGE 51

of specialized services "that one particular department may do best," such as the development of multimedia presentations, Gauthier said.

The task facing the project team is not an easy one, given how heterogeneous that environment is now, Gauthier said. It comprises three key network operating system platforms: Banyan Systems, Inc.'s Vines, Novell, Inc.'s NetWare and Apple Computer, Inc.'s Appleshare. Numerous E-mail packages are also in use.

The university has concluded that DCE is the "only game in town" for providing common communications, security and directory services across disparate client/server platforms, Gautbier said.

University of Michigan's Larry Gauthier: *Team faces difficult task*

Rather than wait passively for vendors to meet its needs, however, the university, along with other members of the academic and scientific community, has been actively pressuring its key network operating system and E-mail suppliers to bring their products up to DCE and X.500 compliance, Gauthier said. The pressure is partly verbal; more practically, however, academic institutions such as the University of Michigan are developing their own DCE and X.500 integration mechanisms and then offering them as prototypes to the vendors.

For example, the university is participating in a project with Novell to develop a gateway that enables a DCE client to transparently access files on a NetWare server, both organizations confirmed.

Make way for Max

In addition, an internal university developer has come up with Max500, which gives a Macintosh user direct access to an X.500 directory with a browse tool. It is based on "Lightweight Directory Access Protocol," a client/server architecture developed by an Internet Engineering Task Force working group, to provide a less memory- and CPU-intensive way for clients to access an X.500 service over a TCP/IP link.

Since accessing an X.500 service natively from a workstation is "like sipping from a fire hose," such a front end is needed to enable an application to sample X.500 information "a sip at a time," Gauthier said.

One main advantage of X.500-based directory services is the potential for interoperability with other organizations' directories for the purpose of sharing resources and interacting with other users, Gautbier said.

The university has come up with some "real exciting applications that can ride on X.500," including the sending of electronic documents with electronic signatures, Gauthier said. Such signatures ensure "that the document is indeed from the designated sender and unchanged" in transit.

However, it is impossible for workgroups using different electronic forms packages to authenticate one another's signatures. X.500 could fix that problem by providing a public key to translate across those environments, Gauthier said.

The university already has an X.500 network up and running on Sun Microsystems, Inc. SPARC 4/470 SunOS boxes and linked with other X.500-based organizational and service directories on the Internet, Gauthier said. The University of Michigan's own directory has almost 100,000 object entries, which can be users or groups of users.

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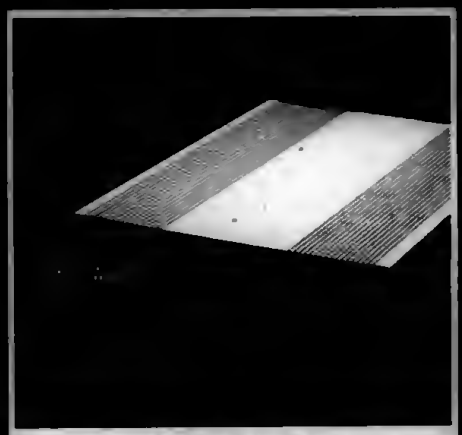

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The Root Group, Inc. has announced PC-Rshell, a distributed management tool that lets remote shells run on the PC.

According to the Boulder, Colo., company, PC-Rshell creates a true peer-to-peer, multiplatform networking environment. The product provides a system administrator that can initiate incremental backups, software updates, virus scans and audits for software, hardware, memory and network configurations from the host on any platform to any PC or random groups of PCs on the network.

Pricing begins at $99 until Feb. 28 and then jumps to $200 after that date.

▶ *The Root Group*
(303) 447-8093

Optical Data Systems, Inc. has introduced the Ethernet "Hub-of-Hub" modules with per-port switching and per-port protocol analysis.

According to the Richardson, Texas, company, the 1094-SBTFL module features 12 or 24 10Base-T copper user ports and four 10Base-FL fiber user ports. It allows any Ethernet port to be software switched among multiple Ethernet segments.

Users receive access to a number of per-user basis capabilities that include statistics, host table statistics, history, packet capture and traffic matrix.

The 1094-SBTFL costs $6,400.

▶ *Optical Data Systems*
(214) 234-6400

Digital Communications Associates, Inc. has announced Irma WorkStation for Windows (IWW) 2.2, PC-to-host software.

According to the Alpharetta, Ga., company, the software supports Microsoft Corp.'s Windows Open System Architecture (WOSA), Windows High Level Language Application Programming Interface (WinHLLAPI) standard.

The product includes QuickLinks, a productivity tool that lets users link host-based information to other Windows applications via Dynamic Data Exchange, and QuickViews, a tool that lets users create custom views of multiple sessions on a screen.

IWW 2.2 costs $495.

▶ *Digital Communications Associates*
(404) 442-4000

Synernetics, Inc. has announced the LANplex 6004 intelligent switching hub.

According to the North Billerica, Mass., company, LANplex 6004 provides switched Ethernet connections, intranetworking routing, a multigigabit backplane and an upgrade path to switched Fiber Distributed Data Interface as well as Asynchronous Transfer Mode in a compact design geared for high-speed departmental or divisional networks.

The hub offers dedicated switched 10M bit/sec. Ethernet connections to shared LAN segments, individual workstations or high-performance servers on client/server "production networks."

It features a 3.2G bit/sec. interconnect and intranetwork routing capabilities, enabling users to optimize the use of existing servers, maximize network performance and decrease the operating costs of client/server computing.

Entry-level pricing for the LANplex 6004 is $16,000.

▶ *Synernetics*
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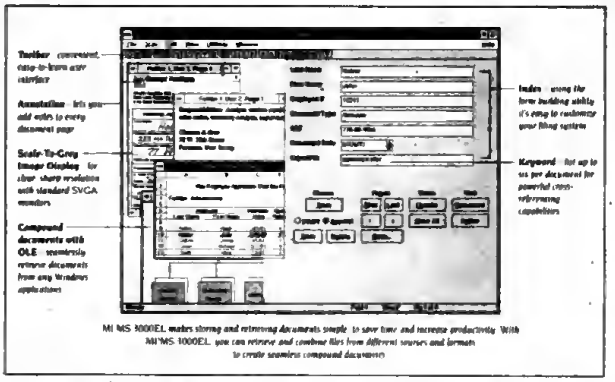

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Users scout for right object DBMS fit

closer look
OBJECT ORIENTED DATABASE

Three organizations examine object-oriented databases from the user view.

VW picks single system

By Kim S. Nash

Volkswagen GmbH plans to construct a single on-line system that monitors every task involved in building, distributing, selling, servicing and putting to rest automobiles built by the German firm, such as all Volkswagen and Audi models.

Dubbed Euro Elan, the application — expected to reach some 110,000 end users by 1997 — is an effort to link car dealerships and factories across several continents to better track inventory, building processes and other aspects of the car business. Volkswagen chose object-oriented databases from Versant Object Technology Corp. to underpin the system.

"The idea is to build a system that all our distributors can use to track cars, from the building of them through selling and maintenance, all the way to recycling them later on," said Joseph Bayrhammer, manager of the technical team at Euro Marketing Systems, a Volkswagen subsidiary made up of representatives from 12 Volkswagen and Audi importers across Europe.

CASE STUDY

Volkswagen GmbH

CHALLENGE: Create a customer-service, order-processing and car-warranty tracking system that includes images and blueprints.

TECHNOLOGY: Pure object-oriented system from Versant.

Those 12 wholesalers are financing the development of this unified system and have put up approximately $8 million so far, Bayrhammer said. The group recently signed a $2.6 million contract for Versant databases and related products, which Versant claimed is one of the largest object-oriented database deals to date.

Euro Marketing wholesalers will either give the completed application to their network of 10,000 individual dealerships in 13 countries worldwide or try to recoup some costs by selling the system to the dealerships.

In late 1992 and early 1993, the group built a prototype of one part of the system to test against several relational and object databases, including Ingres from The ASK Group, Inc., Object Store from Object Design, Inc. and Versant object database management system.

The prototype, which took 1½ man-years to create, showed that "none

Volkswagen, *page 61*

Image management evolves

Orem, Utah-based Digital Technologies International was already a Sybase, Inc. value-added reseller when it decided to anchor a new newspaper image management application on Sybase's SQL Server database.

When the photograph management application was built three years ago, object-oriented databases "just weren't an option," said Garth Despain, marketing director at Digital Technologies. The products were largely unproved, and the companies that make them seemed almost untenable, Despain said. "They were just too new and iffy."

Instead, Digital Technologies relied on Sybase's support for binary large objects (Blobs) for tracking and storing photographs for the application, which starts at less than $6,000 for a five-user system.

The application, one of several newspaper production systems Digital Technologies makes, helps users track, organize, archive and transmit photographs created in-house or received over news wires.

The application also lets users quickly scan photo archives — without having to call up large, cumbersome files — by creating so-called view files, which can be one-quarter the size of a regular photograph or smaller, Despain said. The compressed view file images speed data access and move users through the archives faster, he said.

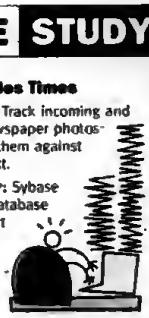
The *Los Angeles Times* is one of the largest users of the application. A year ago, the newspaper built an on-line storehouse of more than 2G bytes worth of photos. It sends about 400 pictures through the system each day. A dozen or so Macintoshes in the paper's graphics department access the system, which is hosted by a Unix-based SPARC 10 server from Sun Microsystems, Inc.

CASE STUDY

Los Angeles Times

CHALLENGE: Track incoming and existing newspaper photos and match them against archived text.

TECHNOLOGY: Sybase relational database with support for binary large objects.



Despain said he likes the "proven technology and security features" of a relational database as opposed to an object-oriented cousin. Further, the photo processing application, he said, probably would not run much more quickly or smoothly on an object database. "Blobs are just fine for this sort of thing where you have to call up and use the whole object," he said.

Digital Technologies has looked at Momentum, Sybase's object-oriented application tool set but has yet to put the products into action.

Renaissance goes hybrid

And then there's the hybrid approach.

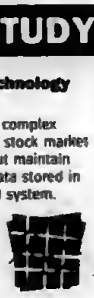
Some users want to play in the object realm but are uncomfortable with placing a mission-critical application on young object-oriented database technology. Renaissance Technology Corp., for example, sought a way to dabble in objects while maintaining an existing investment in relational databases.

CASE STUDY

Renaissance Technology Corp.

CHALLENGE: Perform complex math for forecasting stock market shifts in real time but maintain access to existing data stored in a Progress relational system.

TECHNOLOGY: Hybrid object relational database from UniSQL.



The Stony Brook, N.Y., stock market forecasting firm is nearly finished building a couple of applications that use objects. The first is a financial modeling system that spits out forecasts based on real time and historical stock quotes. The majority of the 30G-byte system is due to be completed this month, with a June target for the entire application, according to Joe Trubisz, senior analyst at Renaissance.

The second application is a stock history system that also contributes to financial analysis. Both systems use objects in that much of the information about a given stock is stored as an object, as is chronological data.

For example, an analyst might want numbers for the last five years on General Motors Corp. stock prices, along with corresponding financial data on the Dow Jones Industrial Average and various other economic measures. Such a query on a plain relational database would involve several table joins that slow processing time.

Safer Sun

Renaissance managers mandated that the information systems department use Sun Microsystems, Inc. workstations and servers, even though IBM RS/6000s tested better in benchmark runs, because the company was unsure of the stability of IBM's AIX operating system, Renaissance's Joe Trubisz said.

Using object technology, the query can be done in a single statement, Trubisz said. "You point and click and don't have to worry about setting up some screwball query across 25 different tables," he explained.

But he did not want to go with a pure object-oriented database, mainly because doing so would involve "practically throwing out" existing legacy data. Plus, the primary stock history firm from which Renaissance gets much of its data uses relational technology. "We needed to hold on to relational ties," Trubisz said.

The company tried out several databases — object and relational — before plunking down $40,000 for a site license for databases and tools from UniSQL, Inc. that combine the technologies.

A pure object-oriented database was out of the question because it lacks a means to let users access relational data, Trubisz said. At the same time, existing applications that rely on the SQL of a relational system cannot be easily ported to an object database. "Where does your SQL investment go? Down the drain," he said.

He noted, however, that despite many handy features inherent in object technology, a major sticking point is its limited ability to support parallel processing hardware. "That, more than anything else right now, would potentially keep us on a relational database if we had to choose," Trubisz said.

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Systems management to see growth

By Joanie M Wexler

The systems management arena could graduate from infancy to toddler stage in 1994 — if vendor plans for integrating products pan out. Product integration, vendor consolidation and the creation of standard interfaces are allowing products such as routers and PCs to work together cohesively for the first time

Most products today offer only piecemeal management of systems and network components. That is not enough for central information systems, which will begin in earnest the search for a cohesive view of disparate enterprise platforms in 1994, users and analysts said.

They noted that this is necessary because systems administrators in far-flung departments who have often been handed the job on top of other unrelated duties are looking to hand the function back to central IS "so they can concentrate on their real jobs," said John Cox, automated operations project leader at the Tennessee Valley Authority in Chattanooga

But for IS groups to get a consolidated grip, product mergers and broad-based efforts such as the Open Software Foundation's (OSF) Distributed Management Environment (DME) have to become a reality. "Futures don't cut it," Cox said.

The results

Budding relationships in this area slated to produce results this year include the bundling of VisiSoft, Inc.'s VisiNet network and systems management software into Microsoft Corp.'s Hermes desktop management system. Also, database system vendor partnerships — including Oracle Corp. with Epoch Systems, Inc., Legato, Inc. and Legent Corp., and Sybase, Inc. with Tivoli Systems, Inc. and Epoch — should begin producing integrated database and systems management products in mid-1994 [CW, Nov. 29]

DME, however, is not expected to be a strong contender this year. While its integrator, the OSF, finally shipped the five-application DME 1.0 in fourth-quarter 1993, delivery of the underlying framework that ties the applications together has been delayed until 1995 [CW, Nov. 15].

Product availability notwithstanding, Cox said, the user community must decide what it really wants in the way of systems management.

Services are emerging to help users with this decision, including the Management of Distributed Environments service from Andersen Consulting, a framework for helping users understand what needs to be done, why management tasks need to be performed and how systems management changes in a distributed environment

One conclusion most companies have already drawn is that "each end-user department doesn't want to replicate systems software expertise," said Tim Boudreau, associate partner at Ernst & Young's New Age Architectures Group in Chicago To avoid this, he predicted, some companies will deploy nontraditional systems management tools, such as collaboration-oriented groupware, to provide distributed help desk and problem management functions

Boudreau said he expects eventual systems management/groupware vendor alliances but that it is not likely to happen this year

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CONTINUED FROM PAGE 57

of the databases really was doing all that we'd like," Bayrhammer said.

The problem with the Ingres relational database was that although it handled accounting data and simple queries pretty well, it bogged down during complicated queries that required several joins. This was partly because there were more than 700 tables to manage, many of which contained images or other unstructured material, he explained.

Meanwhile, the Versant and Object Design object-oriented systems handled complex queries more quickly, but the databases lacked certain relational database features that are often taken for granted, such as some security mechanisms and the ability to handle several gigabytes worth of data.

Euro Marketing chose Versant object DBMS for the following reasons:

- Object technology outperformed relational in dealing with unstructured data. A relational database's add-on support for binary large objects prohibits users from doing queries on the object, limiting an end user's interaction with material stored on the system.
- Versant promised to provide techniques for accessing legacy data stored in relational databases. For example, Volkswagen is using UniSQL, Inc.'s products for linking object and relational data using a query language that can understand the two different systems.
- Versant is in production at several global companies with which Volkswagen conferred during the evaluation process.

Hands-on experience

In addition, many of Euro Marketing's 50 to 60 staff members had experience in building object-oriented applications and wanted to put that knowledge to work, Bayrhammer said.

Although the Volkswagen is the most popular car in Europe, after taxes and other fees are deducted, the company makes a profit of only about $26 on each car sold, according to *AutoWeek* magazine. Volkswagen sold 3.5 million cars worldwide in 1992.

Finding a way to streamline costs is imperative for Volkswagen, which *AutoWeek* said is the highest-cost, high-volume carmaker in the world. Volkswagen expects to see gains from this application in the form of reduced parts inventory and faster customer service.

On-line showroom

For example, if a customer walks through a showroom looking for a black Volkswagen Jetta with sunroof, antilock brakes and no air conditioning, a salesman could use Euro Elan to search for such a vehicle at any of 10,000 dealerships. Currently, such a search is time-consuming because it involves many phone calls and manual eyeballing of production records, Bayrhammer said.

He declined to cite specific estimates of productivity gains or cost savings expected from the application.

However, one worrisome aspect to using relatively new object databases is the lack of security inherent in the products, he said. Object databases such as Versant lack so-called authorization features that prevent certain users from performing specified kinds of queries. But Bayrhammer is sanguine. "Plain database security alone is not enough for most applications," he said. "You usually have to build more [security measures] in yourself anyway."

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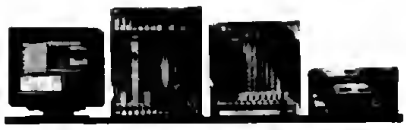

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Managers share 1994 resolutions

By Johanna Ambrosio

For the most part, information systems managers are planning 1994 projects that will quickly benefit business end users. Three areas of focus are data mining, end-user tools and rapid application development.

Albert Collins, vice president at Home Box Office, Inc. in New York, said data mining is at the top of his list. "We are working with the business users as consultants, trying to determine if they know what kind of information exists and how to get to it. Are they using the right tools?"

Home Box Office's Albert Collins: *Data mining top priority*

Another area of development this year, he said, will be to complete the implementation of an Oracle Corp. database management system and to look into an object-oriented database for future development.

Likewise, ITT Hartford Life Cos. in Hartford, Conn., will "look into the issue of integration to provide data and functions to multiple businesspeople on the same piece of equipment," said Robert Lukas, assistant vice president. "We want to present to the end customer an environment that indicates all the business applications are in some way connected."

ITT Hartford's Robert Lukas: *Integration is main concern*

At Agway, Inc. in Syracuse, N.Y., 1994 will be a year of "trying to do things faster — rapid application development. We want to learn how to do more leveraging of what we've got so we can put components together to do more assembly" of applications.

The same will be true at Delta Air Lines in Atlanta. Ron Eubanks, director of information technologies, said, "My biggest concern is being able to provide solutions in a very fast time frame. Applications development has to be done in months, not years."

Similarly, Robert Yates, vice president of information services at the Tennessee Valley Authority in Knoxville, said his focus this year will be "on customer satisfaction — encouraging the use of new technologies to improve productivity of our [information technology] people as well as our customers."

Narrow focus

Some shops are planning specific projects to help particular business units. Alamo Rent A Car, Inc. in Fort Lauderdale, Fla., for example, is developing a cooperative application on mainframes and minicomputers for rental station automation.

"We're trying to get the customer out of the rental station faster," said Tom Loane, vice president.

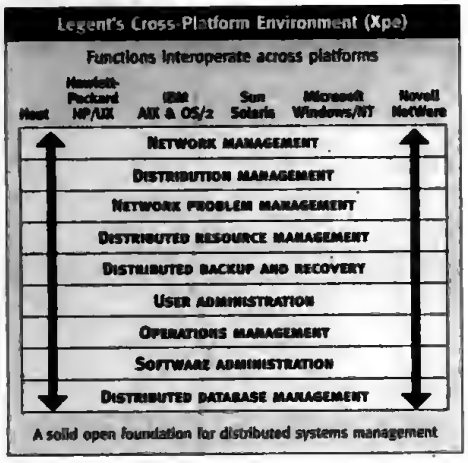
Legent sets eyes on client/server

Xpe improves interoperability across heterogeneous environments

By Gary H. Anthes

The introduction of client/server products by Legent Corp., which began in earnest in 1993, will reach flood tide in the coming year as the company cashes in on a three-year, $50 million product development and acquisition effort.

The products for distributed computing are part of Legent's Cross-Platform Environment, dubbed Xpe, announced by the company in October [CW, Oct. 25, 1993]. Xpe, a client/server architecture consisting of systems management products, middleware, application programming interfaces and development tool kits, is intended to enable Legent's systems management products to interoperate across heterogeneous environments. With Xpe, users will be able to set up interconnected servers for network management, software distribution, resource management, backup and recovery, operations management and other functions (see chart).



"They are really doing their homework and putting R&D dollars into integration and testing," said Kevin O'Neill, vice president of research and consulting at Business Research Group in Newton, Mass. "There will be a lot of meat on the story as the year progresses, and it will hold to some fairly close scrutiny by . . . user accounts."

Spring surprise

A crown jewel of Xpe, to be unveiled in the spring, is an as-yet-unnamed "engineering console," said Robert Yellin, chief technology officer at the Herndon, Va., systems management software company. It is intended to be a "window into Xpe," a diagnostic and control station for Legent systems management servers.

The engineering console will be able to get information from Xpe software agents in each systems management server, from application servers and from desktop machines. It will combine and display that information at a single workstation, enabling a person to see and analyze all system resources on the network from one point. "It looks down like an angel," Yellin said.

According to Yellin, the approach means that when a user installs the first systems management product — for performance management, for example — the Xpe infrastructure is established, and the Xpe agents are in place to support subsequent products such as those for software distribution or user administration.

"It's a good idea but a significant challenge to pull off," O'Neill said. "That they have shown they understand the value of such an entity — to manage these complex distributed applications — speaks well of them."

The console will run on the major Unix platforms, Windows, Windows NT and OS/2.

Legent will also roll out enhanced versions of many of its existing products, offering support for or connectivity to an expanded list of environments.

For example, the help desk product will be able to get trouble tickets from virtually anywhere.

Nynex unit opts for optical disc storage

By Ellis Booker

■ A shift to optical storage has brought savings in time and payroll for a minicomputer support unit at Nynex Corp. subsidiaries New England Telephone and New York Telephone.

The Telesector Resource Group is responsible for the operation and backup of the two companies' Digital Equipment Corp. VMS systems. Within the past 18 months, the department moved from using magnetic tape to collecting data from many systems to using an automated optical disc library from Eastman Kodak Co.

The Kodak library, Model 560, was purchased from American Digital Systems, Inc. in Sudbury, Mass. It holds five 5¼-in. optical drives and stores up to 60G bytes.

At the same time, Telesector centralized its recovery storage.

"We decided to centralize our methodology and get the labor out of it," said Jack Sullivan, senior systems specialist at Telesector.

"We didn't want a different backup scheme on every single system," he said.

The Kodak system saved the company $25,000 in the first year because it obviated the need to hire additional operators to monitor the backup process.

> The Kodak system saved the company $25,000 in the first year because it obviated the need to hire additional operators.

Another savings is time, according to Sullivan, who reported that the optical backup takes four hours — less than half the time operators needed to copy data onto magnetic tape.

Sullivan said the new approach also requires far less operator intervention. The control software for the automated systems, called Branches, comes from Acorn Software, Inc. and runs on Digital VAX/VMS platforms.

New procedure

With the new backup approach, three sets of optical discs are used, stored and reused in rotation. Data is copied onto optical discs once a week, and the discs are sent off-site for two weeks. Discs are returned for reuse after two weeks, once the data they contain has become obsolete.

"This is a different backup schedule than we had for the magnetic tape, since we can hold much more data on each disc," said Ed Macgillivray, tech support/VMS support at Telesector. One optical disc per system is required today, compared with 10 magnetic tapes before, Macgillivray said.

Automated backup to optical is a corporate standard at Nynex, although that standard is an AT&T Unix-based product called Automatic Backup and Recovery System (ABARS). The reason ABARS is not used at Telesector, Macgillivray explained, is that it has had trouble working with the VAX platforms for which the group is principally responsible.

Apple sows seeds of transition with OpenDoc

By James Daly

■ These are exciting times if you are a software developer interested in the Apple Computer, Inc. Macintosh platform. But you may have to put your vacation on hold for, oh, about a year.

With developers polishing applications optimized for the March rollout of the PowerPC-based Macintosh, Apple has begun another software transition effort by seeding selected developers with an initial release of its OpenDoc software architecture.

Document — Open Standard

OpenDoc is a compound-document architecture that lets users create a single document containing multiple types of data, such as text, graphics, sound and videos. It was announced in June as a competitor to Microsoft Corp.'s Object Linking and Embedding architecture and is scheduled to be available by mid-year.

"By seeding selected developers with OpenDoc software at this time, we will be able to work with them to fine-tune the implementation and the transition process," said Kurt Piersol, Apple's chief software architect.

For some developers, however, the OpenDoc release represents software code overkill. "One transition at a time," said Dan Cook, a spokesman for WordPerfect Corp. "We're still in the throes of [Motorola, Inc.] 68000-based Macs and the pressing need to port them over to the PowerPC. OpenDoc is on our minds but not on the development table just yet."

Eclectic breakdown

OpenDoc was designed to simplify the task of working with software applications from various vendors.

For example, many applications may have similar functions but may implement them differently. A text-editing capability can be implemented six different ways on as many different programs. OpenDoc, on the other hand, breaks computerized components into individual parts that can then be manipulated.

OpenDoc will allow applications to be segmented into more uniform components. Therefore, users will be able to create one document using their own section of software components provided by various application developers.

Once OpenDoc parts are generally available from software developers, systems integrators and in-house developers will be able to create custom solutions quickly and easily for their clients, Piersol said.

With a little help ...

Apple has also rounded up its friends to push the OpenDoc design. IBM has announced plans to implement OpenDoc for OS/2 and Unix platforms, and WordPerfect and Novell, Inc. have announced plans to provide the OpenDoc implementation for Windows-based systems.

OpenDoc got another boost late last month when Apple unveiled updated versions of Hypercard and AppleScript that integrate elements of OpenDoc's compound-document architecture.

In addition, Apple is participating in the formation of the Component Integration Laboratories, an industry association that plans to support the transition to component software.

Sharing seven

In September, seven vendors — IBM, Apple, WordPerfect, Novell, Inc., Oracle Corp., Taligent, Inc. and Xerox Corp. — announced an effort to tie together data-sharing technologies: Bento, for storing and exchanging multimedia information; Open Scripting Architecture, for the coexistence of multiple scripting systems; IBM's Systems Object Model for dynamic object linking; and OpenDoc.

Symbiotics fills need for OLE-linking middleware

By Michael Vizard

Sites that cannot wait for Microsoft Corp. to deliver a distributed version of its Object Linking and Embedding (OLE) 2.0 interface may have an alternative from Symbiotics, Inc. in Cambridge, Mass.

Symbiotics plans to deliver in the first quarter an implementation of its NetWorks middleware product that will allow developers to link OLE objects across multiple systems. To accomplish this, Symbiotics will link OLE to its Networks Messaging Facility (NMF), which is a runtime kernel that developers can embed in their applications.

In contrast, Microsoft has said it will not provide distributed OLE capabilities until its forthcoming Cairo object-oriented operating system arrives in 1995. The company just recently began shipping a developer's kit for distributed OLE [CW, Dec. 6].

Dynamic support

Once installed, NMF provides a layer of middleware over which data encapsulated in objects can be exchanged. In addition, NMF already supports Dynamic Data Exchange (DDE) protocols and can be used to translate data between DDE and OLE applications, according to Symbiotics Chairman Robert Paslay.

Information Architects, Inc. in Needham Heights, Mass., intends to use NMF in a set of clinical applications that it is building for hospitals and health maintenance organizations. As part of that effort, the company will build a portable PC application to access clinical data and images stored on separate remote servers.

"We need to separate the code from the network so that we can access the servers remotely, so we've embedded an OLE server in the PC application," said Bernard P. Wess Jr., chief executive officer at Information Architects.

"With images we need a separate server that is optimized for those types of applications," he said.

NMF with OLE 2.0 support has been licensed by Artisoft, Inc., and IBM uses Symbiotics' DDE implementation in OS/2.

Development tools

Little company could give Microsoft a Texas-size boost

By Ed Scannell

A small Texas-based software company may provide Microsoft Corp. with a big advantage over its Unix competitors: It has developed a tool that ports Unix System V Release 4 source code to Windows NT.

Consensys Corp. in Universal City has delivered a development tool called Unite, which brings more than 100 key Unix commands, application programming interfaces and various utilities to the Windows NT environment running on the Intel Corp., Mips Technologies, Inc. and Digital Equipment Corp. hardware platforms.

> "All this mysticism surrounding Unix will force people to take a serious look at NT."
> —Vas Rajevski, Consensys

Unite also supports two Unix shells, the Korn Shell and Berkeley C shell, allowing users to run Unix commands from the NT shell and NT commands from the Unix shell.

Unite supports a Windows interface from which users can manage multiple Unix shells as well as a dialog box interface for every Unix command.

Mission accomplished

"Our goal was to go beyond the standard command line Unix interface for NT and to do a fully integrated Windows-based environment for Unix. I think we have done that," remarked Allen Hustler, director of technology at Consensys.

Using Microsoft's C compiler and Consensys' libraries, users and developers need only recompile their Unix applications to run on the various NT-compatible hardware platforms.

With the Unix operating systems market remaining fragmented and Microsoft officials claiming to have shipped 250,000 copies of Windows NT in four months, Consensys officials sense from their research that many corporate accounts are re-examining their long-term Unix strategies.

Helping the switch

"With Novell sending off mixed messages about its plans and Sun [Microsystems, Inc.] off doing its own thing, some [users] are thinking they should bite the bullet and go with Bill Gates. Our plan is to help those people make that transition," said Vas Rajevski, director of sales at Consensys.

Getting corporate and third-party developers to switch to Windows NT will eliminate many of the traditional headaches they encounter in setting up Unix, particularly with networks, Consensys officials said.

"Networking under Unix is just a hitch, pure and simple. Under Windows NT, in many cases,

Unite, *page 66*

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Object technology

Booming object market holds promise for Unix

By Jean S. Bozman

Unix workstations have long been object technology platforms, but the emergence of multimedia and increased vendor support for object languages and class libraries will accelerate the trend.

The overall object-oriented market now totals about $450 million and is heading for $1.5 billion by 1996, according to Meta Group, Inc. in Westport, Conn.

"More people are willing to try it, partly because there are more products to try," one West Coast information systems manager noted. Until now, workstations have handled object development easily because they have been more powerful than PCs and have high-resolution displays to show complex relationships among objects.

But, as PCs begin to enter the Unix workstation price/performance range, those lines will blur, predicted Julie Rodwin, a principal at R. M. Fichera Associates in Groton, Mass.

Smalltalk alternative

For longtime Unix programmers, the transition to objects can be relatively easy despite a learning curve of several months, analysts said. "It's a natural extension for programmers to go from C to C++," said Bill Martorelli, a Meta Group software analyst. However, many workstation users, especially those interested in using objects for commercial applications or simulation, use Smalltalk, users said.

"We use it for simulation and for developing multimedia applications," said Tom Soon, a research project manager at Pacific Bell in San Ramon, Calif. What began in the laboratories several years ago is now spreading to development groups tackling complex applications, Soon said.

Saving money is an important consideration that causes some sites to develop objects on 486-based PCs for deployment on more costly Unix workstations, developers said. At Hughes Enterprise Information Systems, Hughes Aircraft Co.'s information systems unit in Long Beach, Calif., 35 of 200 programmers use Parc-Place, Inc.'s VisualWorks application builder on 486 PCs.

Object code written with the cross-platform application builder is quickly ported to Unix and Macintosh machines. "We can't control the hardware our customers use, so we build the software once and deploy it on many platforms," said Hughes IS consultant Jim Godwin. But the benefits are clear: Software maintenance costs are reduced; programmer productivity is up; and up to 60% of code can be reused, Godwin said.

Object-oriented development with Unix workstations

Building objects with Unix workstations

- Driven by distributed applications and multimedia applications.
- Variety of object tools and languages supported.
- More power and speed than desktop PCs to build complex applications.
- Vendor support: Sun's Project Distributed Objects Everywhere with Next Computer, Inc.'s NextStep class libraries, future Sun and Hewlett-Packard Co. support for NextStep and IBM's partnership with Object Design, Inc.
- Common development environments: Smalltalk, C++ and Objective C.

Unite

CONTINUED FROM PAGE 63

you just point and click and you can be on a network," Rajevski said. "All this mysticism surrounding Unix will force many people to take a serious look at [Windows] NT," Rajevski said.

At least one Unix user in a large information systems shop strongly agrees with Rajevski.

"If you are just adding a hard drive or tape backup to a [Unix-based] system, it doesn't hurt to be directly related to God. You need help at that level to get this stuff to work together," he said.

Long wait ahead

Just in terms of installing and configuring software in complex combinations, users largely agree that Windows NT's "point-and-click" approach could make their computing lives easier.

But they also said the span of corporate users with different flavors of Unix is so great that it will be a very long time before products such as Unite can glue the important Unix fragments together.

"The product sounds like a very nice idea that can fill some niches. The question is how many companies will fall into that [Unix System V Release 4] niche in such a fragmented market," said Mike Drips, an information systems executive in Tampa, Fla.

Consensys developed Unite using Microsoft's Win32 compiler to recompile Unix source code, which ensures strict compatibility with Unix applications, company officials said.

"When you buy this you are getting guaranteed Unix compatibility," Rajevski said.

Available now, the base product of Unite costs $395, and the development version costs $495. A package containing both costs $695.

Digitalk, Inc. has announced the Parts Assembly and Reuse Tool Set (PARTS) Workbench for Win32, a 32-bit visual development environment for Microsoft Corp.'s Windows 3.1 and Windows NT.

According to the Los Angeles company, PARTS Workbench is a visual, object-oriented client/server technology that enables very rapid application construction from prefabricated software components.

The product comprises a workbench and a catalog of more than 60 prebuilt visual and nonvisual components.

Users can create applications in three steps by dragging and dropping parts from the catalog into the workbench, visually wiring parts together and running the application.

PARTS Workbench for Win32 costs $1,995 but is available at an introductory price of $995 through 1994

▶ *Digitalk*
(310) 645-1082

Micro Focus Publishing has introduced Micro Focus Workbench Navigator, a learning tool designed for Micro Focus' Cobol Workbench application development environment.

According to the Palo Alto, Calif., company, the product runs as a graphical user interface application under Windows or OS/2 and is written in Micro Focus Cobol.

Features include pull-down menus with "hints and tips" and "common problems and solutions" for Workbench components including editing and debugging tools; search and retrieval tools; a note-taking system for adding personal comments and ideas to the on-line resources already available; and step-by-step instructions for configuring the Workbench environment and components.

A single copy of Workbench Navigator costs $149. The product is available through Micro Focus Publishing for $74.50 through Jan. 31.

▶ *Micro Focus*
(415) 856-4161

Bristol Technology, Inc. has introduced Xprinter 2.2, an X Window System printing library.

According to the Ridgefield, Conn., company, the product allows PostScript and Printer Control Language (PCL) printing through the Xlib application programming interface.

Xprinter 2.2 also enables developers to add PostScript, PCL 5 and PCL 4 support to their applications without having to learn either printer language.

Xprinter is available for $1,900

▶ *Bristol Technology*
(203) 438-6969

Brio Technology, Inc. has announced DataEdit Version 2.0, a rapid client/server application development tool.

According to the Mountain View, Calif., company, the product lets Macintosh and Windows users build forms-based applications for networked SQL databases.

Features include automatic version control, cross-platform deployment and intuitive forms building for instant development.

DataEdit is a front-end client for relational databases and supports a variety of popular SQL databases.

The developer version costs $999; the client version costs $199

▶ *Brio Technology*
(415) 961-4110

Cadre Technologies, Inc. has announced the availability of its Teamwork family of software development automation products on Sun Microsystems, Inc.'s Solaris for x86-based machines.

According to the Providence, R.I., company, Teamwork tools were designed to help developers accurately model, define, analyze and document product requirements and specifications to generate consistent design and code.

Pricing starts at $8,500.

▶ *Cadre Technologies*
(401) 351-5950

Brooktrout Technology, Inc. has introduced the Brooktrout Prompt Development Tool Kit, which allows users to create, edit and save voice files for use in voice and integrated fax and voice response systems.

According to the Needham, Mass., company, the product includes Microsoft Corp.'s Windows Sound System and Brooktrout's Prompt Conversion utilities.

The Sound System lets users create and edit prompts and convert them into the appropriate file format by using the conversion utilities.

The product costs $495.

▶ *Brooktrout Technology*
(617) 449-4100

Software Research has announced STW/Advisor, a complement to Software TestWorks, its family of testing tools.

According to the San Francisco company, STW/Advisor was designed to provide insight for the developer, tester and manager of source code.

STW/Advisor comprises an X Window-based metric analysis product, Metric System, which provides all of the commonly accepted software metrics for programs written in C, C++, Ada and Fortran; a C static analyzer, Static, for syntax and semantic analysis; and Tdgen, a test data generator.

STW/Advisor prices start at $5,000.

▶ *Software Research*
(415) 957-1441

Product short

EMS Professional Shareware has introduced an updated version of the Win-Util Library CD-ROM. Thirty-four public domain and shareware products have been added. The library features 739 utilities and houses an assortment of files that include benchmarking, configuration, database, diagnostic, memory management and security. Cost: $59.50 on CD-ROM or $99.50 on diskette. EMS Professional Shareware, Olney, Md. (301) 924-3594.

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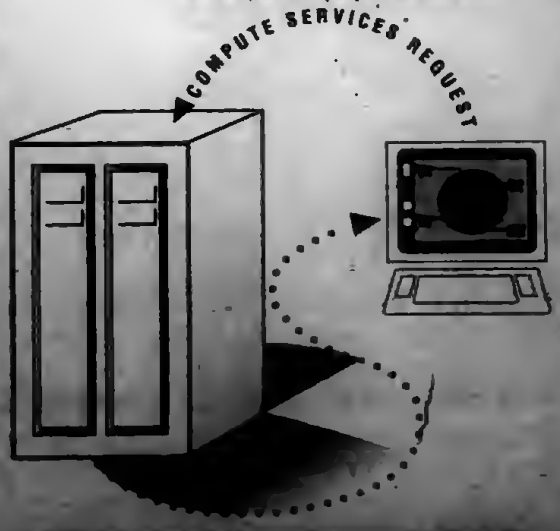
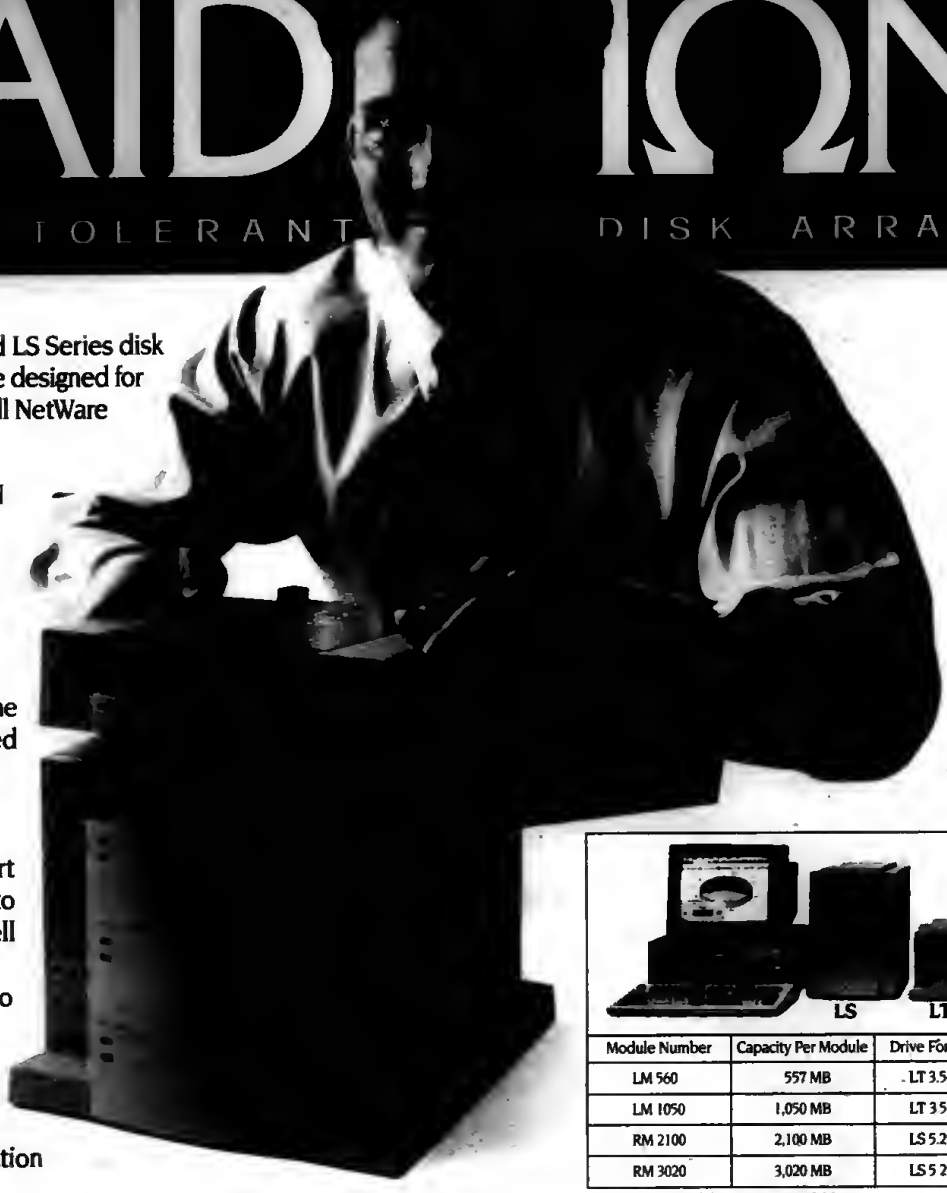


SAS INSTITUTE INC.

RAID ION

FAULT TOLERANT DISK ARRAYS



RAIDION LT and LS Series disk array subsystems are designed for use with either Novell NetWare 3.11/4.0 or IBM OS/2.

MIRROR. RAIDION can be configured with 2 modules to provide mirrored fault tolerance up to 3 GB.

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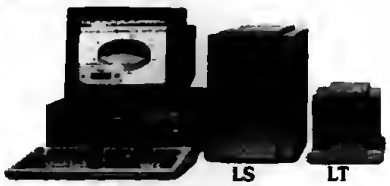

Module Number	Capacity Per Module	Drive Form Factor
LM 560	557 MB	LT 3.5-inch
LM 1050	1,050 MB	LT 3.5-inch
RM 2100	2,100 MB	LS 5.25-inch
RM 3020	3,020 MB	LS 5.25-inch

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ECONOMICAL. An LT Series three module 2 GB array is just $7,545. An LS Series Raid 5 array with a capacity of 6 GB lists for just $16,980. That's less than $3.00 per MB. It's no wonder Byte Magazine said: "RAIDION's *low price alone makes it worth considering.*" August, 1992

AWARD WINNING. In a benchmark comparison of disk arrays, Corporate Computing said: "*Raidion was our overall winner with an impressive combination of high performance, low cost, and unparalleled expandability.*" May, 1993.

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Information . . .

Superstar consultant Tom Daven says IS nee to think mo about ecolo and less ab plumbing it the profess hopes to survive

WEBB CHAPPELL

Please

By Joseph Maglitta

Tom Davenport preaches what he practices: continued growth.

True, Davenport, a luminary at Ernst & Young's Center for Information Strategy and Technology in Boston, gives more than 300 talks a year on business process re-engineering, the booming field he helped popularize.

But Davenport, who has taught at MIT and Boston University, continues to branch into new areas. Lately, the author of Process Innovation: Re-engineering Work through Information Technology (Harvard Business School Press, 1993) has been focusing on what he terms "information ecology" and "information behavior."

This spring Davenport will publish articles on those topics in the Sloan Management Review (Winter 1994) and Harvard Business Review (March/April, 1994).

His basic message: The information systems profession must continue to evolve. That means IS professionals must focus more on the information those systems provide to their organizations.

Joseph Maglitta, Computerworld's senior editor of corporate strategies, recently spoke with Davenport about his latest work.

Q:

Your upcoming *Harvard Business Review* article is titled "Saving IT's Soul." Is the technology profession really in need of saving?

A: I think you could argue that we are. It's as if we're at middle age and we've misspent our youth, and our midlife crisis is that people don't think the stuff we offer is terribly valuable.

Q: Why?

A: We've made promise after promise that "Yeah, when the new technology comes we'll solve this information problem." Yet if you did a nationwide survey of managers and asked, "Do you get the information you need?", the vast majority would say, "No." There have been some Conference Board surveys like that. I think managers are more and more suspicious of computer-based solutions to information problems.

Q: What's the problem?

A: Our whole approach to information management has been dominated by the engineering design/architectural kind of model. Typically, most architecture only addresses the technology component, not the human side.

Q: And the consequence?

A: What that means is that we spend an awful lot of money on information systems that don't really get used very well. Pacific Bell's Eric Firdman says it's like we've been bringing water to the horse for 40 years without knowing whether the horse was thirsty or how to encourage him to drink.

Davenport, *page 72*

Inside

Training your IS group to think like vendors. Page 77.

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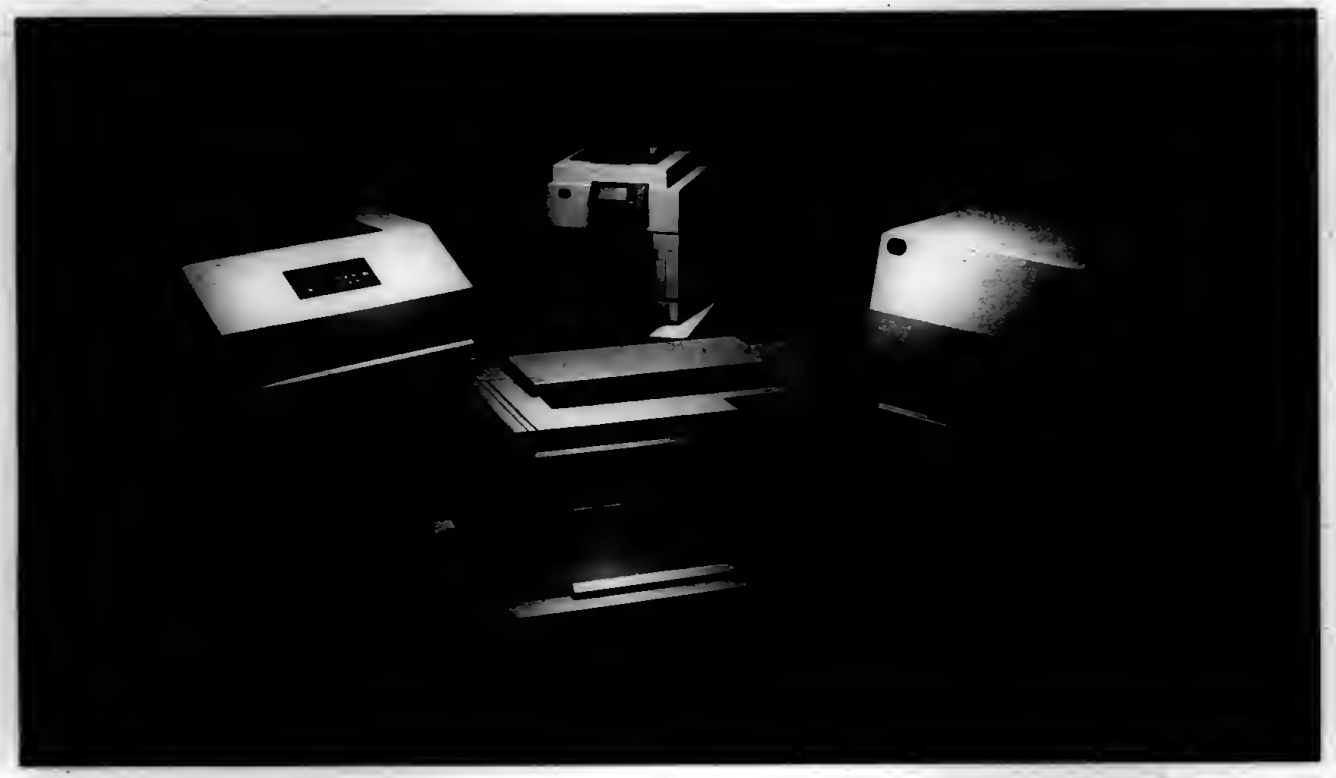

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Davenport

CONTINUED FROM PAGE 69

The evidence is fairly strong that managers get very little of the information they care about from computers. Even engineers and scientists get most of their technical information from talking to other scientists.

How can we start to facilitate those kinds of behaviors instead of just throwing technology at the problem? How can we stop assuming that because we build an information system these people are going to get the information they need?

Q: And the answer is?
A: IS should be doing human-centered information management.

Q: How?
A: You focus on information of a variety of types, not just the stuff that happens to be in computers.

We advocate trying to do some innovative management of multiple information types [e.g., video, data and voice] through multimedia and all the other new technologies.

Q: You use the term "information ecology." What does that mean?
A: The ecological view is kind of an orientation to behavior (see chart below). It recognizes that there are living, breathing, thinking people who are involved in this information environment. How they use the information, whether they use the information, how they share it, whether they share it starts to be very important. We've never really focused much in that area, as an IS community or as a society in general.

Q: How did the notion evolve?
A: We looked at very large and sophisticated companies: American Airlines, Union Pacific, Pacific Bell, IBM, Hewlett-Packard, etc. and asked them, "Do you have an information architecture? Have have you had one in the past? Was it successful?"

We did one survey of 35 managers and found only one that said, "Yes, we have an information architecture that we're happy with." So we said, "There's something wrong here."

There is a lot of research that says information architectures and approaches like IBM's [Business Systems Planning] and strategic data modeling, at least at the enterprise level, don't work. So we started thinking metaphorically. Ecology sort of stuck.

Q: Does that mean that architecture doesn't work any more?
A: It's only workable at a narrow level. If you want to build a payroll system, it's fairly useful.

But if you are trying to manage the organization's entire set of information assets, it's just not workable.

It's like the difference between city planning, which has never succeeded in creating a vibrant city — go to Brasilia and see how well that turned out — versus designing a building, where it works fine.

Q: What's the strength of an ecological perspective?
A: There's a holistic aspect: Everything is related. Doing an information plan by itself doesn't make a whole lot of sense if it's going to be influenced by the process plan, the business strategy or the organization and culture.

There's a certain humility about it. We can't plan all these things at once five or 10 years out, so we do a little bit and we see what happens and we do a little bit more and we see the complexity of all this.

Q: Why have flexibility and usability and human issues become a big issue now?
A: They should have always been an issue. We're a very technologically utopian kind of culture; we tend to assume that technology is going to solve our problems. Plus, there's a pretty strong vendor community out there saying, "Buy this stuff and it will help you out." There's a pretty strong press for the technology, too.

Q: So IS has focused on technology to its own peril?
A: I don't think you can be an effective manager without caring about information. But you can be a fairly effective manager without caring a whole lot about information technology. Obviously, the two are related — and I'm certainly no Luddite — but I think we've really neglected the information side.

Q: For several years, IS people have been hammered on to look to these kinds of "soft" issues. What are they still missing about all this?
A: IS professionals approach every interaction with their customers with the implicit assumption that a computer-based application system is going to be built as a result of this information need. You don't find very many IS people who say, "The information you need is really in a document somewhere and you don't need a system to get it."

Plus, we've tended to fragment information support by the medium over which the information is delivered. So librarians deal with books and documents, competitive intelligence deals with ad-hoc studies and external market research, and IS people deal with computer systems.

"I don't think you can be an effective manager without caring about information. But you can be a fairly effective manager without caring a whole lot about information technology."

You don't really have anybody who is the chief information officer. Often, the controller is the chief financial information officer. But as for a person who can unite financial information with process information with market information, there's just no contender for that throne in most organizations.

Q: Are senior IS executives the best ones to pull this together?
A: IS people ... are probably better positioned to make this shift more than any single group. It is, after all, called chief information officer, which sounds like a role oriented to dealing with information, not technology.

Q: Sounds like a huge role change.
A: I almost think that you have to give up the plumbing if you are going to focus on the water. Maybe [you can], if you're the kind of IS organization that has said we can outsource facilities management [and] commodity application development.

What's left? Two things. One is business change and process change. The other is information. You have to be willing to surrender a pretty big part of your traditional empire in order to get this new part.

Q: Is there precedent?
A: There was a movement 10 or 15 years ago called information resource management (IRM). It's pretty much died out now, but one of its central tenets is that you're really out to manage in an innovative fashion libraries, records management, office automation and IS. One of the reasons IRM [nearly] died is that people view it as being self-serving for heads of data processing because they were the ones who were going to get this big pool of resources.

Q: Do you absolutely need a strong central figure?
A: At Ernst & Young, we are about to create a chief knowledge officer. But it's not necessary to create an information czar. It's too powerful a role for a lot of organizations.

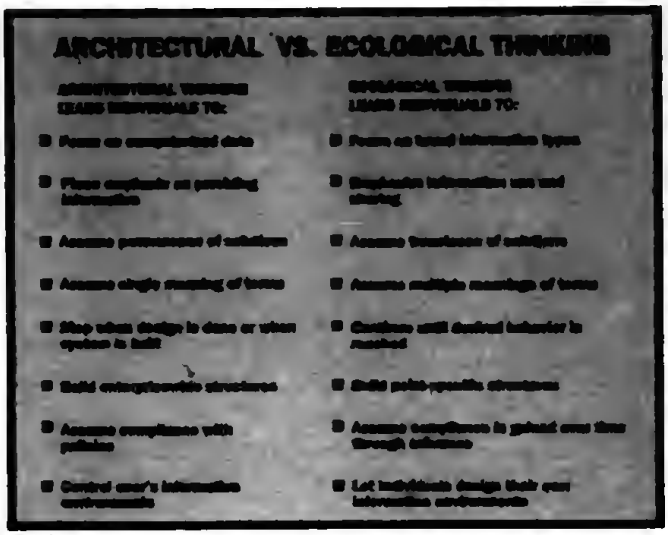
Q: Can anyone, in fact, really manage "information behavior?"
A: Again, you can't make the horse drink, but you can certainly facilitate the horse drinking. And you can create incentives for people to share and to use information that might not have been there in the past.

Sharing is critical. We're doing all sorts of things at companies in which sharing information is a critical factor for their success.

Business process re-engineering is a very obvious example. Things like [Lotus] Notes and knowledge bases are another good example.

Q: If information is political currency, what can IS people do to help spread the wealth? In many cases they lack needed clout.
A: Just raising the political issue is one thing. You may not be able to change the model from feudalism — where you have all these feudal barons who own the information in their business — to federalism, where people talk about it and share and argue. But you can at least identify the leaders of each fendal barony and

Davenport, *page 77*



Source: Ernst & Young

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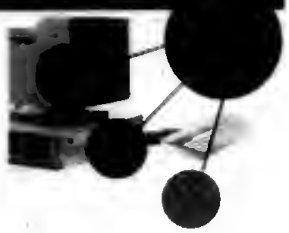

Esther Dyson
EDventure Holdings, Inc. Publisher Release 1.0

Moderator

She is Editor and publisher of the influential newsletters Release 1.0 and Rel-EAST. Release 1.0, widely respected and quoted for over 10 years, focuses on new developments in software and software design, applications, networking and the transforming of new technologies into commercial solutions. Dyson promises a frank and forthright review of the client/server uprising.

David M. Carlson
Kmart Corporation, International Headquarters

invited by COMPUTERWORLD

As Senior Vice President in Corporate IS, Carlson has been noted for creating a vision for automation and technology. The company's retail automation program saves Kmart approximately $200 million annually through UPC symbol scanning, on-line credit authority and automated layaway. Carlson's work has been recognized in awards by SIM and Computerworld

L. John Severson
The Trane Company

invited by NCR

As VP, IT and Change Agent, he initiated and has provided leadership for a massive re-engineering effort, called Business Transformation. He is responsible for the design and construction of the client/server infrastructure which will enable and support transformed business processes. He has provided IT leadership, pioneering in such areas as end-user computing, telecommuting and outsourcing,

Roy W. Camblin
CIO for Oracle Corporation

invited by Price Waterhouse

As Senior Vice President, he is responsible for defining and implementing Oracle's internal information systems and support services. Prior to joining Oracle, Camblin worked at Wells Fargo where he managed technological and operational support for more than $20 billion of business transactions daily. In 1989, he received "Information Systems Visionary Award" for his work in client/server technology.

32 Bit Operating Systems & Apps

John Gantz
International Data Corporation

Moderator

As Senior Vice President at IDC, Gantz oversees research in desktop automation and workgroup and office computing. His coverage also includes PC hardware, software, and pricing, as well as open systems, PC channel support, and LAN-based computing. Gantz brings 20 years of research authority and candor to a closer look at how 32-bit technology will perform in the trenches.

George Oliver
The Royal Bank of Canada

invited by COMPUTERWORLD

As Manager of Information Delivery Technology, Oliver has spearheaded the Royal Bank's Information Delivery Technology Group which oversees PC, LAN, Security, Self Service and Office Technology products. With this group as the technology catalyst, the Royal Bank has evolved its delivery systems from a central-site computing focus into a distributed cooperative enterprise of mainframes, LANs and PCs.

David A. Poesak
E I DuPont Nemours, Inc.

invited by SunSoft

As Principal Consultant, Advanced Computer Technology and Corporate Advisor, he has had responsibility for planning and managing projects in computer science and technology. He has chaired or served on corporate committees on Open Systems, Data Security, Workstation Selection, Software Auditing, Technology Planning Expert Systems and Electronic Conferencing.

Imaging/Work Flow Technology

Charles Babcock
Technical Editor, Computerworld

Moderator

Babcock reports on the pivotal technologies that are shaping IS in the '90s. In addition to extensive coverage of user and vendor sites, he writes a weekly column on major technology trends and directions. Babcock has served as mid-Atlantic news correspondent, senior software editor and assistant news editor. Working out of the West Coast News Bureau, he brings an astute perspective to his assessment of imaging/work flow technology.

Ronald L. Baker
Connecticut Mutual Life Insurance

invited by COMPUTERWORLD

In the past five years as Vice President, IS Planning and Operations, he has held executive management responsibility for corporate level technology services, including information architecture, corporate business applications, mainframe computing, database services, network services, PCs and client/server computing. He has played a leading role in deploying image workstations and client/server technology.

Michael R. Owens
Corporate Administrator, State of Delaware

invited by Wang

As Corporate Administrator, he is responsible for direction and supervision of all day-to-day operations of the Delaware Division of Corporations, including administration of a $4.7 million budget. Delaware is home to over 214,000 corporations, including over 50% of the Fortune 500.

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Dale Kutnik
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Dale Kutnik is president, research director and founder of the META Group.

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PacifiCare Health Systems

David T. Aldridge
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The CTO Perspective

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Leo Collins is director of Applied Technology and Information Architecture for PacifiCare Health Systems.

David T. Aldridge is vice president and chief technology officer for BancOne Diversified Services Corp., a $76 billion corporation in banking and finance.

Catherine Loup
The Research Board

The Uncharted Territory

An exclusive look into the top forecasts and analyses from The Research Board.

Catherine Loup, is partner and vice president of research at The Research Board, which convenes its 90 members to debate findings and to benchmark their experiences and best practices as CIO's of some of the country's most important businesses.

Loup will conclude the Summit with a look into the future of each of these three technologies. Will the other technology trends surpass, supersede or sideswipe client/server, 32-bit systems and imaging/work flow? Will these technologies evolve — or converge — in predictable or non-predictable ways?

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- 31. Programming Management, Software Developers
- 41. Engineering, Scientific, R&D, Tech. Mgt.
- 50. Sys. Integrators/VARs/Consulting Mgt.

CORPORATE MANAGEMENT
- 11. President, Owner/Partner, General Mgr.
- 12. Vice President, Asst. VP
- 13. Treasurer, Controller, Financial Officer

ADMINISTRATIVE MANAGEMENT
- 51. Sales & Mktg. Management
- 70. Medical, Legal, Accounting Mgt.

OTHER PROFESSIONAL MANAGEMENT
- 80. Educator, Journalists, Librarians, Students
- 90. Other Titled Personnel

3. Do you use, evaluate, specify, recommend, purchase: (Check all that apply)

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- ☐ Solaris (a)
- ☐ Netware (b)
- ☐ OS/2 (c)
- ☐ Unix (d)
- ☐ Mac OS (e)
- ☐ Windows NT (f)
- ☐ DOS Windows (g)

App. Development Tools
- ☐ CASE (h)
- ☐ C++ (i)

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- 60. Government - State/Federal/Local
- 70. Communications Systems/Public Utilities/Transportation
- 80. Mining/Construction/Petroleum/Refining/Agri.
- 90. Manufacturer of Computers, Computer-Related Systems or Peripherals
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- 120. Other _____

2. WHO DO YOU WORK FOR (Circle one)

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- 21. Dir./Mgr. MIS Services, Information Center
- 22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data/Tele. Comm. Network Sys. Mgt., LAN Mgr., PC Mgr.
- 23. Dir./Mgr. Sys. Development, Sys. Architecture
- 31. Programming Management, Software Developers
- 41. Engineering, Scientific, R&D, Tech. Mgt.
- 50. Sys. Integrators/VARs/Consulting Mgt.

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- ☐ Windows NT (f)
- ☐ DOS Windows (g)

App. Development Tools
- ☐ CASE (h)
- ☐ C++ (i)

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MARKETING THE IS DEPARTMENT

How IS beat the outsourcers at Amoco

When an Amoco IS group bid against outsourcers, its staff learned how to think like vendors

By Ellis Booker

After months of evaluating bids from several vendors, Bill Lucas, supervisor of planning systems at Amoco Co.'s Engineering and Facilities Services unit, picked his "preferred vendor."

The winner was the in-house information systems team at Amoco's research center in Naperville, Ill. But the real competition wasn't outsiders — it was old attitudes.

More and more, internal IS departments are asked to go head-to-head against outsiders. It's part of a general trend in both business and government to slough off noncore competencies to outsiders, forcing the internal staff to work more efficiently.

The process causes an IS organization to sit back and ask "what value do we bring" beyond what an outsourcer can provide, according to Mike Wilson, manager of the research center's information and computer services department.

Amoco's IS organization was under pressure to become more business-minded. Wilson says he saw the bidding process as a possible catalyst for cultural change. "Our goal was to change the [IS department's] mind-set, to get us thinking more like a vendor," he explains.

The part of the process that seems to have had the biggest impact on IS attitudes was the financial commitments IS made in its bid, he adds.

Reaching for STARS

The contract Wilson's team fought for and won was the right to build an application known as Service Tracking and Request System (STARS). Using client/server, Unix and relational database technology, STARS will replace a decade-old mainframe system used to manage "job orders" for the physical facilities and grounds at the research center — a sprawling, 178-acre, 20-building campus in Naperville.

The STARS bid began in the middle of 1992. After analyzing the existing mainframe-based system used by the facilities group, Amoco determined that the mainframe couldn't be upgraded to handle greater job-order demands, and a new application had to be built from scratch. Because this involved a new application on a new platform, the immediate reaction was to go to an outside source. Rather than look only to outsourcing, however, management wanted to give Wilson's department a chance to bid, Lucas says.

Wilson and his supervisor of computer facilities and operations, Mark Ramsey, were also eager for their department to get a shot at the $200,000 to $300,000 project. Wilson had already watched Amoco's Canadian operation outsource its data center a couple of years ago, and he was looking for an opportunity to go up against external competition and use the process to change his organization's culture.

Risks and demands

The decision by Wilson and Ramsey to respond to the request for proposal (RFP) called for IS to take on risks it had never assumed before.

For starters, the RFP insisted on a "fixed-price" bid. In the past, the internal IS team had always charged its services to the business units on a "time and materials" basis. This aspect, according to Ramsey, was the biggest mind-set change.

"We'll monitor our costs very carefully and stringently adhere to our project management procedures," he says, adding that some automated tool for capturing these will probably be needed.

"This is the first time, too, we've ever had to offer a warranty," Ramsey says. (His team eventually decided on a 90-day warranty, with system enhancements charged on a time and materials basis.)

A second risk was that the RFP called for developing a STARS prototype. But the IS group had to do this work without charging its time (about 100 man-hours) back to any Amoco department.

"If we didn't get the bid, we couldn't bill back the hours," Ramsey notes.

Ramsey says he believes the advantages to IS working this way are twofold. First, fixed-price bids give IS a way to make a profit, provided it accurately predicts the development costs for a project's life cycle. Second, such bids provide a way for IS to discover its worth in the eyes of the organization, its customer.

An ancillary plus, Ramsey says, is that his group will retain distribution rights to the application code it writes and could "remarket" an application to other in-house units or even external customers.

"It's not inconceivable that down the road we could find a broker to market [our code] on the outside," he says. IS could not only function as a vendor inside the walls of the organization but also become one in actuality.

While Amoco's sweeping review of cost-effectiveness in its business units ended its first phase in December, the second phase, a four- to six-month process that will specifically consider outsourcing, will get under way soon.

The upshot of this activity is that the STARS project will likely be deferred, according to Wilson. Nevertheless, the review will actually be an incentive to respond "post haste" to more RFPs, Wilson says, as each win will provide evidence that his IS group's value is properly calibrated and greater than outsourcing alternatives.

While it's too early to tell whether the culture has been changed in Wilson's group, the terms of the contract will force IS to be business-minded from now on — or risk financial problems for the department. ■

THE INSIDE TRACK

Service and experience won the bid for Amoco's IS group.

Do you have to lowball an outsourcer to win an in-house IS contract? Not necessarily. The in-house IS group at Amoco's Engineering and Facilities Services unit wasn't the low bidder. The group won its STARS contract for three other reasons, according to Bill Lucas, supervisor of planning systems:

- **Support/service.**
  Already on the Amoco campus, the in-house group was seen as having an advantage over the out-of-state bidder, an out-of-state company.
- **Ability to interface to existing legacy systems.**
  While several external vendors said they would also provide the interfaces, they would have needed Amoco's own IS team to modify those host systems to support the new application.
- **Experience with a Unix-based relational database.**
  Amoco's internal IS group has already built applications with products from Oracle Corp., and this was considered a leg up for the STARS application, which may be built in with a relational database from Sybase, Inc.

Davenport

CONTINUED FROM PAGE 72

start to do some limited actions that get people to talk to each other.

Q: Seems like a dangerous role.

A: I think you have to be politically astute about it. It's a lot of backroom dealing and telling the other person that you will give them that if they give you this. You become sort of an information broker.

Q: Practically speaking, what else can CIOs and other IS leaders do today to improve corporate information use?

A: In a lot of cases what you really want is to start to build coalitions. IS should be aligning with librarians, the market researchers, the competitive intelligence people, in some companies there are executive assistants who are really the main sources of information for senior managers.

Creating an information map is a really good first step, which can itself be quite political. You've got to keep pounding and eventually the environment is going to start getting better.

And, like everything else, partnering with the CEO. If the CEO is very closed and secretive about information, you're not going to have an open, democratic information environment, almost no matter what you do.

Q: Anything else?

A: Just as people are starting re-engineering groups, you could start an [internal IS] group focusing on getting the information [business users] really need as opposed to building the systems they really need.

Q: Anybody stand out in your mind as doing an exceptional job in this area?

A: At [General Motors Corp.], there's Vince Barabba, head of corporate information management. He's a really fascinating fellow who was head of market research at GM and was head of the U.S. Bureau of the Census under three presidents. Here's a guy who really knows information.

Q: Your recent writings call information management infrastructure a "new competitive weapon." How so?

A: Because business changes so fast, if you are going to build new technology applications to support business needs you can't be always starting from scratch.

You've got to have a highly capable infrastructure, so that if your competitor changes the nature of the competition you can immediately build an application that supports it.

The classic example is the airline industry. American announces its frequent-flier programs. United, because of its infrastructure, is able to match it in 10 days.

That's the kind of responsiveness that you have to have in the current business environment.

Q: Back to our starting point: What does all this bode for the fate of IS?

A: If everybody is interested in information, and everybody knows how to use a computer, and everybody knows how to create object-oriented programs, what's left for IS?

I think you could take two routes: the business change/information, high value-added route or the low-level plumbing route. Yes, maybe the bulk of the IS profession will become plumbers. I suspect for the most part these people will go to plumbing companies, as they do now.

I know which choice I would prefer, and which is going to get the highest salaries and most prestige. ■

Executive Track

Julie G. St. John has been named senior vice president of transaction processing and management systems, and **Michael J. Williams** has been named senior vice president of customer applications and technology integration at the **Federal National Mortgage Association** in Washington.

Wilma Horne has been named vice president of information systems at **Ethicon, Inc.**, a subsidiary of Johnson & Johnson Co. in Somerville, N.J. She reports to Chief Financial Officer Ronald Fulop. Prior to joining Ethicon, Horne was director and chief information officer at the Port Authority of New York and New Jersey.

Xyplex, Inc. in Boxboro, Mass., has announced that **Brian W. Hebert** has been named manager of IS applications and **Peter J. Marinn** has been named manager of IS operations in the corporate MIS group based in the Littleton, Mass., facility. Prior to joining Xyplex, Hebert was employed at Sybase, Inc. and Computervision. Marino was previously at National Computer Systems, Intermetrics, Avco, Computervision and Sugarman Brothers.

Curtis Burns Foods in Rochester, N.Y., has announced the promotion of **Robert E. McMahon** to corporate vice president of MIS. McMahon was elected to the position by the Curtis Burns board of directors. He was previously vice president of MIS at Comstock Michigan Fruit Division, a division of Curtis Burns.

Robert A. Zawacki has been promoted to emeritus professor of management and international business and will take early retirement from the University of Colorado at Colorado Springs to join **KPMG Peat Marwick** as distinguished scholar in residence. He will continue to lecture, conduct research and consult on the human and organizational side of information technology worldwide. He is known for his book *Motivating and Managing Computer Personnel* (Wiley Interscience, New York, 1979).

Recognition International, Inc. in Dallas has appointed **Lucie Fjeldstad** to its board of directors. Fjeldstad was previously responsible for the leadership of multimedia activities at IBM. She is also on the boards of PPG Industries, Inc., KeyCorp and Entergy Corp. and is chairman of the Board of Regents at Santa Clara University in California and a trustee at Syracuse University in New York.

Renato Crocetti, corporate vice president of information and technology at **Automatic Data Processing, Inc.** in Roseland, N.J., has been elected a member of the Conference Board's **Council of Information Management Executives**.

Metropolitan Life Insurance Co. has appointed **Paula Loring Simon** as general manager of its Scranton (Pa.) Information Systems Center and vice president of the company. Before joining Met Life, Simon was a vice president at Dow Jones Telerate. She is also a former president and trustee of the Society of Women Engineers and has served on the Information Systems Advisory Council of the American Management Association.

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Calendar

JAN. 23-JAN. 29

The Ninth General Assembly of the World Teleport Association. Washington, Jan. 22-26 — Contact: World Teleport Association, Alexandria, Va. (703) 914-0014.

Dema '94. Palm Springs, Calif., Jan. 23-26 — Features new products. Contact: InfoWorld Editorial Events, San Mateo, Calif. (415) 312-0545.

Technology '94. San Francisco, Jan. 24-26 — Contact: Robertson Stephens & Co., San Francisco, Calif. (415) 781-9700.

ComNet '94. Washington, Jan. 24-27 — Focus: networking and communications technology. Sponsored by *Computerworld* and *Network World*. Contact: World Expo Corp., Framingham, Mass. (508) 879-6700.

ProForum. Jacksonville, Fla., Jan. 24-28 — Focus: wireless voice and data. Contact: National Engineering Consortium, Chicago, Ill. (312) 938-3500.

Fourth Annual "Achieving Quality Software" Tutorial and Conference. San Diego, Jan. 26-28 — Speakers include Barry Boehm, University of Southern California, and Ron Radice, director of the Software Process Program. Contact: Vince Heald, Beck-Eilman Agency, La Mesa, Calif. (619) 469-3500.

10th International Conference on Engineering Information Systems: Product Data Management & Alternatives. Dallas, Jan. 26-28 — Contact: Managemeal Roundtable, Boston, Mass. (617) 232-8080.

JAN. 30-FEB. 5

14th Annual Florida Educational Technology Conference. Tampa, Fla., Jan. 31-Feb. 4 — Contact: Bureau of Educatioeal Technology/Florida Education Center, Tallahassee, Fla. (904) 488-0980.

Improving Productivity in System Development. Scottsdale, Ariz., Jan. 31-Feb. 4 — Keynote: "Sociological Aspects or Technological Change." Speaker to be announced. Ten related workshops available April 11-12. Contact: Karen Hedden, Applied Computer Research, Inc., Phoenix, Ariz. (602) 995-5929.

Executive Technology Summit '94. Tarpon Springs, Fla., Feb. 2-4 — Sponsored by The Society for Information Managemsnt and *Computerworld*. Contact: ATI Travel Managemeot, Chicago, Ill. (312) 644-6642.

FEB. 6-FEB. 12

Concepts '94. Orlando, Fla., Feb. 7-8 — Focus: specialized mobile radio and cellular. Contact: American Mobile Telecommunications Association, Washington, D.C. (202) 331-7773.

Building Enterprise Architectures. Washington, Feb. 8-10 — Contact: Technology Transfer Institute, Santa Monica, Calif. (310) 394-8305.

FEB. 13-FEB. 19

Sigda: Workshop on Field Programming Gate Arrays. Berkeley, Calif., Feb. 14-15 — Contact: Association for Computing Machinery, New York, N.Y. (212) 944-1318.

The Sixth Annual Software Support Conference. San Francisco, Feb. 14-16 — Contact: Jan Rosenthal, Institute for International Research, New York, N.Y. (212) 661-3500.

Mobile World. Dallas, Feb. 15-17 — Contact: Digital Consulting, Inc., Andover, Mass. (508) 470-3880.

Distribution/Computer Expo '94. West Irvine, Calif., Feb. 16-17 — Contact: C. S. Report, Uwchland, Pa. (215) 458-6410.

Government Technology Conference SouthWest '94. Austin, Texas, Feb. 16-18 — Contact: Government Technology Conference, Sacramento, Calif. (916) 363-5000.

FEB. 20-FEB. 26

SHARE Winter 1994. Anaheim, Calif., Feb. 20-25 — Keynote Speaker: Ellen Hancock, IBM senior vice president and group executive. Contact: SHARE, Inc., Chicago, Ill. (312) 822-0932.

Representing the Technology Client: Critical Legal and Business Issues for the Computer Lawyer. Atlanta, Feb. 24-25 — Contact: Barbara Fieser, Computer Law Association, Fairfax, Va. (703) 560-7747.

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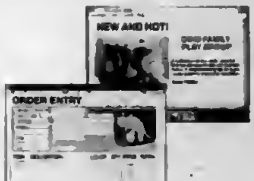

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On the occasion of the Mac's 10th birthday, we brought together the brains behind the machine — eight of its original developers and gurus — to muse on what the PC industry's next big hit might be. With the same creative fervor they used to build a revolutionary computer, these wizards take on interactive TV, personal digital assistants, Microsoft and one another.

BY JAMES DALY

Ten years ago this month, Apple Computer, Inc. President Steve Jobs reached into a canvas bag at the company's annual stockholders' meeting and pulled out the future.

"Hello," said the synthesized speech of the freshly liberated PC as Jobs set it on the table. "I am the Macintosh. It sure is great to get out of that bag."

Ten million Macintoshes later, the oddly shaped PC is still thought of as the product that brought plain people, uninterested in the particulars of technology, into the information age. Apple's "insanely great" computer, as Jobs called it, featured an innovative use of screen icons, simple-to-use software and a handheld mouse that set it apart from the dense DOS commands of the stalwart IBM PC.

Mac turns 10, *page 82*

THE MAC TURNS 10

MAC MAVENS (LEFT TO RIGHT) STEVE CAPPS, CHRIS ESPINOSA, ANDY HERTZFELD, DONN DENMAN, BILL ATKINSON, JEF RASKIN, LARRY KENYON, BUD TRIBLE

Mac turns 10

CONTINUED FROM PAGE 81

Its arrival was heralded by a $400,000 commercial, run during the 1984 Super Bowl, that cast IBM as an Orwellian despot and the Macintosh as a liberator.

It was, they simply said, "the machine for the rest of us."

On the eve of the Macintosh's 10th anniversary, *Computerworld* senior correspondent James Daly tracked down some of the key players in the creation of the Macintosh, many of whom are still pushing the boundaries of personal computing. Some are focusing their energies on other endeavors. (A spokesperson for Jobs, chief executive officer at Next Computer, Inc., said that Jobs "doesn't want to talk about the Macintosh anymore. He's focusing all his energies on Next right now.") But most were enthusiastic to get back together.

The two-hour meeting took place at Apple's new research and development facility in Cupertino, Calif. A late autumn rain had just moved through. It had been years since some of the participants had seen each other, but they still enjoyed a goofy dorm room camaraderie reminiscent of the Macintosh development days when they kept a pirate flag on their wall, worked in a building alongside a gas station (lovingly called Texaco Towers) and vowed to "put a dent in the universe."

Participating in the discussions were Andy Hertzfeld, Bill Atkinson, Jef Raskin, Steve Capps, Larry Kenyon, Donn Denman, Bud Tribble and Chris Espinosa (see page 83 for descriptions). After hugs, handshakes and a quick catch-up on their lives, we reflected upon the work they'd done and considered the possibilities for the future.

CW: If you were going to design an insanely great machine today, what would it look like?
CAPPS: It wouldn't be a desktop computer, I can tell you that.
HERTZFELD: It's an exciting time to be in computers because it feels a lot like 1976. At that time, no one knew the form PCs would take, but everyone knew it was going to happen. The information superhighway is just a metaphor for something that no one can identify.

WILLIAM MERCER MCLEOD

My big concern is that we in the industry are totally out of touch with what real people's behavior is.

CHRIS ESPINOSA

The basic components — the chips — are good enough and cheap enough to get computers everywhere in people's lives. That was the theme of the Mac — getting the computers closer to people.
ATKINSON: Or even *on* your person. Everywhere. In Orson Scott Card's [book] *Speaker for the Dead*, the computer was a little crystal that went in your ear and could listen to everything in the room and kind of whisper to you. It wasn't thought of as a computer. It was a computer-derived friend to a network.
RASKIN: It's an analogy back to the Macintosh. Designing something from the human being out, rather than the way it was designed before, starting with hardware and then trying to create something wonderful.
KENYON: [It's about] optimizing the user's time rather than optimizing the computer's time.

CW: How far away are we from these technologies?
ESPINOSA: My litmus test is when something first appears in a *New Yorker* cartoon. I saw one recently of a dog tapping away at a computer, and it said, "On the Internet, no one knows you're a dog." (Laughs)
KENYON: Some of the technologies are available today, but the hard thing to call is when you are going to reach critical mass. All these things are possible in isolation, but it's not really magic until you get something on the market.
TRIBBLE: We're getting there. The ubiquity of the technology is what creates the explosion. Computers have become cheap enough to put on your desk, and the tools to get on and off the network are becoming ubiquitous. Computers are living in your TV. They're living in your phone.
CAPPS: We have a lot of CPU cycles for the user. Now we have to figure out how to use them.
ESPINOSA: What's amazing about the last 10 years is not how far we've progressed, but how far we've regressed. We've increased the fundamental computing power 100 times, and the range of present applications is amazing. But the way people are experiencing computing power is still through the workplace, in a heavily regimented and controlled MIS mentality, and through networks that are extremely complicated. We've gotten down to a lowest common denominator of two or three dominant applications and a lot of other stuff that no one understands.

WILLIAM MERCER MCLEOD

The ubiquity of the technology is what creates the explosion. Computers are living in your TV. They're living in your phone.

BUD TRIBBLE

ATKINSON: The telephone was easier to use when it first came out because you turned the crank and said, "Can I talk to Betty?" and you got her. Now you have to learn all these dials and digits.

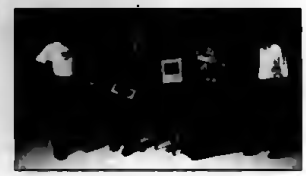
CW: We've complicated things, rather than simplified them.
DENMAN: Anything that is easy to use will have more and more features added until it becomes slightly more complex than people can tolerate. Then the manufacturers will back off.

MAC VS. THE 'DWEEBS'

BY STEVEN LEVY

If one had had any motivation to shoot down the Mac in 1984, he or she could not have asked for a bigger target. Forget that its cursor keys were missing in action and that its adherents — and designers — were a hit, um, flaky . . . *where was the software?*

For the longest time, you could only buy a paint program, a word processor that couldn't handle a file bigger than 10 pages and a rather underpowered though easy-to-use spreadsheet. Though Apple sold modems to connect Macintoshes to telephone lines, for months the only telecommunications program available was MacTEP, written by hacker Dennis Brothers for his personal use and given away free. Instead of software, you had Steve Jobs going coast to coast promising that 500 people were *working* on software.



THE WAY THEY WERE IN 1984 (LEFT TO RIGHT): BILL ATKINSON; ANDY HERTZFELD; CHRIS ESPINOSA, ANALOG BOARD AND VIDEO DESIGNER; GEORGE CROW, MARKETING PERSON; JOANNA HOFFMAN; DIGITAL BOARD DESIGNER BURRELL SMITH; AND INDUSTRIAL DESIGN ENGINEER MANAGER JEROLD MANOCK

Apple took its lumps. But what was ultimately the most harmful assessment of the Macintosh came from the people in charge of buying computers for large corporations, the Fortune 1,000. These management information services managers lived by an unwritten code: One would never, ever go wrong by sticking to whatever IBM called a standard. When Macintosh appeared, they were quick to invoke the code, as if holding a crucifix to ward off a vampire. And then they hit Macintosh with their best shot. This was not, they claimed, a computer.

This was a toy.

Actually, Apple had been terrified that people would actually dismiss Macintosh as just that . . . a toy. There was some substance to the charge. It *was* fun to use, after all. The wizards designing Macintosh considered it an open invitation to childlike play and judged that ability among its chief attributes.

Yet by 1984, the company was ferociously downpedaling Mac playfulness. It was as if the company, by eschewing the machine's perceived childish aspects, was determined to establish the manhood of the Macintosh.

But the testosterone issue was lost already. The previous paradigm of computing — command-based, batch-processed, barely coherent — was deeply associated in the MIS community with masculinity. One's virility was associated with the gunmetal boxes and dense nonintuitive interfaces of those dense beasts. If you weren't familiar with ">A prompts," if you didn't know what SYS.CONFIG meant, you had no hair on your chest.

And what kind of person used the mouse? A wimp, obviously. Some New Age softie who babbled about using the right side of his or her brain. Columnist

APPLE'S CAMPAIGN TO SELL THE MAC TO BUSINESS PEOPLE ON THE GO DIDN'T QUITE CATCH ON. SOME BRANDED IT A TOY.

CW: We've hit on an interesting point here in that some feel that computers have become too complicated and counterproductive in some instances. It sounds like we're talking about the need for intelligent agents that scan all these digital networks, sift through all the noise and then come back with only what you need to get your job done or enjoy life more

CAPPS: If you log into the Internet, you can see how it's become the CB radio of the 1990s. You can see how much chaff there really is. And one of our challenges now is *not* to make it into the next CB radio and how we can make it useful. *Fun* and useful.

CW: What kind of human interface are we talking about? Voice or handwriting recognition? The chip in the ear Bill Atkinson mentioned?

DENMAN: Speech recognition is incredibly exciting because that's the way we communicate.

HERTZFELD: But it's hard to see how speech recognition could be the defining technology for a computer because you can't use it in many circumstances. If I had to talk to my computer in this meeting, I couldn't use it very well.

KENYON: I think an interface technology that tries to imitate a human is very tricky. A mouse or a keyboard is not trying to imitate a human. The problem with voice recognition or handwriting recognition is that it's very easy to come out on the low end of the curve.

ESPINOSA: Human interface issues are only limited by the applications. The problem is that we've gotten into this application model where the application is God. If you look at Microsoft Word, it has 40M bytes, and it has hundreds of features that no one will ever use.

KENYON: The big question is: What are computers used for, and what do we want them to be used for?

CW: So, can a Macintosh — something that brings the industry a whole leap forward all at once — be invented today?

ALL: Sure.

ESPINOSA: But not as a PC. When the Mac was introduced there weren't 100 million PCs. Today, I don't think you can have a small company breaking into a strong established marketplace with little opposition. Back then, people didn't have this preconception of what computers had to be, even though there was an MIS priesthood of big computers.

ATKINSON: Now there's an MIS priesthood of little computers.

ESPINOSA: We have to create new categories. It's much easier to create a new product in a new category than to create a revolution in something that has this huge installed base.

CW: Andy, you once said the Macintosh was a machine with a rebel heart. Is it still possible to create a machine with a rebel heart?

HERTZFELD: Sure, it just comes from the personalities of the designers and what they are trying to accomplish. We weren't trying to appeal to the core of the mainstream with the Mac but more the artist and the creative people on the fringes. Many people [are] like that and still have just as much a need.

Wilson Marks/Microsoft

We rested on our laurels way too soon with the Mac. Had we kept the same fervor for a couple more years, the computing world would be a lot different.

STEVE CAPPS

CAPPS: The biggest representation of this mentality is the Internet. It's so great that something that big is not centrally controlled and not for profit.

TRIBBLE: The revolution in applying communications to technology is going to be similar to the social dislocations that happened with the telephone. The telephone didn't catch on overnight. It was used in the office, never at home. Only after decades did it become socially acceptable. And remember that one telephone is not an interesting invention, but two telephones *are* an interesting invention.

CW: But isn't it nice to see the democratization of the computer?

CAPPS: You mean the *capitalization*, with a capital C. What we need to do is keep the Barry Diller's out of it for a while before it turns into QVC. That's going to happen.

ESPINOSA: I think the political repercussions of the ubiquitous computer are very interesting. The 1992 election was the first significant shift in the use of media since the Kennedy/Nixon debates. Clinton used call-in radio and call-in television. The fabric of society is going to change. The White House is on-line. Think about it.

CW: What technologies in the future will we not want to use? Take brain implants, for instance. I'm not sure if I want a chip in my brain.

RASKIN: I will not want to browse 500 channels. I know that.

DENMAN: I want the computer to browse the channels for me and tell me what would be interesting to watch. I want it to listen to what I'm watching and what I'm not watching and think about what I might want to watch and program that way.

HERTZFELD: Interactive is really a paradigm shift. It's not just TV with choices.

RASKIN: But people don't want to interact. People are inherently lazy. They want to select.

HERTZFELD: Yet look at videos. You can watch them free on TV, rent them or buy them. These are just levels of choices. I think Interactive TV is just another choice.

ESPINOSA: I think the old mechanisms about where the money flows and why won't work

Mac turns 10, *page 85*

WHO'S WHO in our Mac roundtable

Bill Atkinson
THEN: Wrote QuickDraw, MacPaint and Hypercard.
NOW: Chief technologist at General Magic.

Steve Capps
THEN: Helped develop Finder.
NOW: A distinguished engineer at Apple and lead software architect on the Newton project.

Donn Denman
THEN: Wrote the desk accessories and MacBasic.
NOW: Programming developer tools at Apple.

Chris Espinosa
THEN: Supervised the writing of manuals and technical documentation.
NOW: Works on the Apple/IBM relation; ship and runs the project offices for Taligent and Kaleida.

Andy Hertzfeld
THEN: Wrote most of the Macintosh tool box.
NOW: A vice president and programmer at General Magic.

Larry Kenyon
THEN: Worked on the file system, drivers and boot code.
NOW: Programmer in Apple's Newton group.

Jef Raskin
THEN: Credited with having started the Macintosh project in the sense of creating a computer that featured a small footprint, low price and bit-mapped display.
NOW: Human interface design consultant and writer.

Bud Tribble
THEN: Manager of software engineering.
NOW: Vice president at SunSoft, a Sun Microsystems, Inc. software subsidiary.

John Dvorak contrasted the Mac with the new version of IBM's computer, the AT, and called [the AT] "a man's computer designed by *men* for men."

An [industry] pundit in 1984 encapsulated the Mac's problem: "In spite of its impressive capabilities, the Mac simply doesn't have the look and feel of a business computer."

Apple failed by making Macintosh too subtle, too elegant, too easy to use ... and, in spite of its protests, too much fun. Incoherence, ugliness and a steep learning curve were indicators that a machine was powerful. Pain meant gain.

What really terrified Apple's directors was the alleged gulf between the people who designed Macintosh — people like Andy Hertzfeld and Burrell Smith and Bill Atkinson, who probably didn't even own suits — and the Brooks Brothers data processing managers who fondly remembered punch cards. The latter were the people who happened to control the purchases of computers in Fortune 1,000 corporations.

Poor Apple. It thought that the Macintosh interface would take the world by storm. When the revolution failed to materialize, its minions were stunned. "I used to think that you couldn't get large numbers of people to really accept personal computers until you had what we delivered — consistent user interface, direct manipulation, modelessness, WYSIWYG and so on. That you couldn't sell [a brain-dead system like] DOS to a lot of people. Yet DOS outsold the Macintosh!" complained [Apple executive] Larry Tesler, years later.

"What I didn't understand was that most people didn't get to make their own decisions. The mistake we made was assuming that these individuals [in MIS positions] would have in mind the ease of the people who would use them. I never believed that they would go by other criteria. I couldn't believe they would spend weeks training people to use a system that they hated."

As the Macintosh struggled through 1984, the man who would help save it was traveling around the country with a small stack of the new Sony floppy disks. His name was Paul Brainerd.

THE MACINTOSH WAS INTRODUCED TO THE WORLD IN A TV COMMERCIAL DIRECTED BY RIDLEY SCOTT (OF "BLADERUNNER" AND "ALIEN" FAME). THE MESSAGE OF WHICH WAS TO FIGHT BIG BROTHER-TYPE CONFORMISM. THE AD WAS SEEN AS A THINLY VEILED JAB AT THE IBM MONOPOLY.

His disks held an Alpha version of PageMaker, a program his newly formed company [Aldus Corp.] was developing for the Macintosh.

PageMaker allowed you to venture into Mac's virtual reality, manipulate columns of texts and pictures to create beautiful page layouts and emerge from the informationscape with a finished publication in hand.

On July 15, 1985, Aldus sent out the finished version of PageMaker. The Macintosh finally had its VisiCalc, an application program worth buying a computer for.

Mac vs. 'dweebs,' *page 85*

Computerworld Editorial (January-June, 1994)

Issue Dates	Ad Closings Color*	Ad Closings B&W	Editorial Features	Show Distribution	Ad Readership Study Issue	Response Card Deck
Dec. 27 & Jan. 3	Dec. 10	Dec. 17	**Special Edition:** Annual Forecast Issue			
Jan. 10	Dec. 24	Dec. 31	**Closer Look:** Object Database Management Systems		Starch	Mails: Jan 12 Close: Dec 11
Jan. 17	Dec. 31	Jan. 7	**CW Guide To: Spreadsheets and Spreadsheet Utilities** The New Capabilities *Buyers' Satisfaction Scorecard.* Windows Packages from Borland, Lotus, Microsoft, etc. *Firing Line:* Latest Windows Offering			
Jan. 24	Jan. 7	Jan. 14	**Closer Look:** ATM	**ComNet** Washington D.C., 1/25 - 1/27		
Jan. 31	Jan. 14	Jan. 21	**CW Guide To: Departmental Servers and Superservers** Matching a System to Departmental Needs (including Alpha, Tricord, Netframe, Sun, RS/6000, NCR, Sequent, Wyse, Compaq) *Buyers' Satisfaction Scorecard.* Leading RISC Servers *Firing Line.* Latest Server Product	**Executive Technology Summit** Tarpon Springs, Florida 2/2 - 2/4		
February		Dec. 27	**CLIENT/SERVER JOURNAL**	All Shows Feb. - April	Harvey	
Feb. 7	Jan. 21	Jan. 28	**Special Quarterly Report:** Re-engineering the Workplace		Starch	Mails: Feb 9 Close: Jan. 3
Feb. 14	Jan. 28	Feb. 4	**CW Guide To: Management Tools for Large Networks** What Works When Systems are Distributed *Buyers' Satisfaction Scorecard.* Multivendor Network Management Software from DEC, HP, IBM, Sun, etc. *Firing Line:* Latest Management Package	**Networks Expo** Boston, 2/15 - 2/17		
Feb. 21	Feb. 4	Feb. 11	**Closer Look:** Windows and OS/2 Imaging Software			
Feb. 28	Feb. 11	Feb. 18	**CW Guide To: Work Flow Software** The Reality Behind the Promises *Buyers' Satisfaction Scorecard.* Leading Work Flow Software Systems *Firing Line:* Latest Work Flow Managers	**GroupWare '94** Boston, 2/28 - 3/3		
Mar. 7	Feb. 18	Feb. 25	**Closer Look:** Desktop Laser Printers		Starch	Mails: Mar 9 Close: Jan 31
Mar. 14	Feb. 25	Mar. 4	**CW Guide To: RAID** Choosing Among the Various Levels of Disk Array Technology *Buyers' Satisfaction Scorecard.* Leading Server-based RAID Systems *Firing Line:* Latest Mainframe RAID Subsystem			
Mar. 21	Mar. 4	Mar. 11	**Closer Look:** Unix Workstations	**UniForum** San Francisco, 3/23 - 3/25		
Mar. 28	Mar. 11	Mar. 18	**CW Guide To: Wireless Networks** The Spectrum of Technologies, Including LANs, WANs and Radio Frequency *Buyers' Satisfaction Scorecard:* Leading Wireless LANs *Firing Line:* Wireless Services Product			
Apr. 4	Mar. 18	Mar. 25	**Closer Look:** Personal Productivity Software			
Apr. 11	Mar. 25	Apr. 1	**CW Guide To: NT vs. OS/2 vs. Unix** Desktop and Server Choices *Buyers' Satisfaction Scorecard:* Leading Server Operating Systems from IBM, Microsoft, Sun, etc. *Firing Line:* Latest Desktop Operating Systems from a Leading Vendor		Starch	Mails: April 13 Close: Mar. 17
Apr. 18	Apr. 1	Apr. 8	**Management Special:** IS Architecture in Times of Change	**AIIM** New York 4/18 - 4/21 **SIM Conference** Florida, 4/20 - 4/22		
Apr. 25	Apr. 8	Apr. 15	**CW Guide To: Data Access Tools** New Tools for Quick Access to Data Buried in Older Flat-file and Hierarchical Databases *Buyers' Satisfaction Scorecard:* Leading SQL-based Data Access Tools *Firing Line:* Latest Data Access Tool from a Leading Vendor			
May		Mar. 30	**CLIENT/SERVER JOURNAL**	All Shows May - July	Harvey	
May 2	Apr. 15	Apr. 22	**Closer Look:** Distributed Computing Environment	**Interop + Networld** Las Vegas, 5/2 - 5/6		
May 9	Apr. 22	Apr. 29	**CW Guide To: Mobile Computing** From Notebooks to PDAs *Buyers' Satisfaction Scorecard:* Leading Notebook Computers *Firing Line.* Latest Sub-notebook Product from a Leading Vendor	**International DB2 Users Group** San Diego, 5/8 - 5/12		Mails: May 11 Close: April 14
May 16	Apr. 29	May 6	**Special Quarterly Report:** Re-engineering the Workplace		Starch	
May 23	May 6	May 13	**Windows World Open Supplement** **CW Guide To: The Impact of OLE 2.0** What OLE can do for IS and How to Make Sure Your Favorite Desktop Software Vendor is Up to Speed *Buyers' Satisfaction Scorecard.* Leading OLE Applications *Firing Line.* Latest OLE Development Tool	**Windows World** **Comdex Spring** Atlanta, 5/23 - 5/26 **DB Expo** San Francisco, 5/24 - 5/27		
May 30	May 13	May 20	**Annual Job Satisfaction Survey** How IS Professionals and Managers Really Feel About Their Jobs and Careers			
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June 13	May 27	June 3	**Closer Look:** AS/400		Starch	
June 20	June 3	June 10	**CW Guide To: Mainframes** How Big Iron Vendors are Answering the Challenges of the Mainframe's Changing Role *Buyers' Satisfaction Scorecard.* Leading Mainframes from Amdahl, HDS, IBM, etc. *Firing Line:* Latest Mainframe Model			
June 27	June 10	June 17	**Closer Look:** PCMCIA Cards	**PC Expo** New York, NY, 6/28 - 6/30		

Editorial contacts (508) 879-0700 CW Guide: The Guide includes a package of articles on the stated topic, in addition to Buyers' Scorecard and Firing Line
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***Color close also applies to ads within Special Editorial Features and Premium Positions.**

Mac turns 10

CONTINUED FROM PAGE 83

anymore when there is a lot of high bandwidth point-to-point digital and everyone has the power to process all the movies, all the pictures, all the sounds they've got with high-quality fidelity. It's going to be very weird. And the big corporations are having a hell of a time figuring out how they're going to tap in and keep control and get money.

TRIBBLE: What you'll see happen is technology for billing and transactions at the one one-hundreth of a cent level. It's the companies that know how to do that that will figure out how to make money in this environment. It'll be like the phone company, making a little money off millions of transactions.

KENYON: What about the future of interactive person to person? Are we still going to write letters or notes back and forth?

ESPINOSA: My question is what do a bunch of well-off white Californians know about this anyway?

HERTZFELD: We're in a position to shape this. Whether we do a good job or not has a lot to do with the future.

ESPINOSA: My big concern is that we in the industry as whole are totally out of touch with real people's behavior.

HERTZFELD: I don't believe that at all. I don't believe I could design anything if I felt that way. As soon as you start designing for the customer as an alien, you design a bad product. Because you're scared of them ... scared of offending them, and you don't know what they like. But if you think of the customer as yourself and people like you, then you have a prayer. One of the secrets of the Mac is that we all felt we were making something that we really, really wanted — bad.

CW: Did the Mac turn out to be everything you hoped for?

HERTZFELD: The most poignant thing about the way things worked out is that Windows, with its inferior copy of the Macintosh [interface], has captured at least six times as many users. It's cliche now, but it's really good to license software freely. If Apple had done that even five years after the Mac shipped, it could have made the difference.

CAPPS: But Apple would be a lot poorer than it is now.

ESPINOSA: And so would we.

HERTZFELD: I think a lot of people underestimated the goodness of having the hardware and software wedded together. Microsoft and IBM also freely licensed a lot of the complications and confusion. It seems that the biggest impact we had was on the design of Microsoft Windows. I was reading an article about the elements of Windows — that it lets you control these radio buttons. We invented those and [Microsoft] copied it exactly.

CAPPS: They not only had the gall to copy the software, but they copied the manuals.

KENYON: There's a huge design space out there, and I just wish Microsoft had done their share of exploring. You invent something great, and Microsoft comes and takes it away.

CAPPS: What I want to know is who here thinks that 50 years from now the Macintosh will even be known in the world of computing?

ESPINOSA: It's possible that in 50 years there will be some technology that carries the Mac brand, but it won't be a computer.

CW: Looking back, is there anything you would have done differently?

KENYON: I don't think we would have done anything different that day, we just would have accelerated our efforts. It would have been more solid at first.

CAPPS: We rested on our laurels way too soon with the Mac. Had we kept the same fervor for a couple more years, the computing world would be a lot different. I feel strongly that the power is in the second major release. That's when you can atone for your mistakes, but there's still not enough users that you can't move the battleship. With Mac Plus we took a baby step when [we] should have taken a giant step.

ESPINOSA: I would have put a good database on the machine. There wasn't a database available.

DENMAN: We only put one button on the mouse. I would have added one. A shift-click button.

RASKIN: The solution would have been two buttons with labels on them — Select and Activate.

HERTZFELD: What we weren't smart enough to realize was the way that desktop publishing would help sell the machine. It gets back to empowering the individual.

KENYON: I think the Macintosh will be pointed to as something that had a catalyzing effect on the industry. There was a lesson there in making something accessible, which behaves consistently and is easy to use. But even today, that's a lesson we have not yet learned. ■

WILD AND CRAZY GUYS: (FRONT ROW L. TO R.): HERTZFELD, RASKIN, ESPINOSA. (BACK ROW, L. TO R.) KENYON, DENMAN, CAPPS, ATKINSON, TRIBBLE

WILLIAM WRIGHT/BIG TOO

There's a huge design space out there, and I just wish Microsoft had done its share of exploring. You invent something great, and Microsoft comes and takes it away.

LARRY KENYON

MAC VS. THE 'DWEEBS'

CONTINUED FROM PAGE 83

Several months before PageMaker shipped, Apple began viewing the concept of desktop publishing in a different light — as something that could bolster the flagging sales of Macintosh itself. Brainerd's liaison at Apple asked him to prepare a marketing report on the concept of desktop publishing. This 20-page white paper went directly to John Sculley. In the months that followed, Apple paid close attention to Aldus, and when PageMaker shipped, Apple contributed to its marketing costs — everything from cross-country press tours to advertisements in *The Wall Street Journal*. "Apple was desperate to differentiate Macintosh from the IBM PC," Brainerd recalls. "Desktop publishing was their only viable option."

PAUL BRAINERD, FOUNDER OF ALDUS, HAS BEEN CREDITED WITH SAVING THE MACINTOSH'S SKIN BY PROVIDING IT WITH A BONA FIDE BUSINESS APPLICATION — DESKTOP PUBLISHING

It worked. Brainerd recalls visiting potential corporate buyers who at first would sneer when he pulled the Macintosh out of the case. "That's a toy," they would say. Then he would run PageMaker, and it would become clear that the toy was a tool, at least as far as producing visually attractive documents was concerned. To appease the in-house publication people — who by then were salivating with anticipation — the company would reluctantly agree to buy a [few] Macintoshes and LaserWriters.

And a strange thing happened. The anti-Macintosh arguments of the management information services dweebs slowly began to lose currency. The superiority of the Macintosh system would win converts. The workers in the publishing division would discover that spreadsheets and word processors on Macintosh operated with the same intuitive charm as PageMaker and benefitted from the consistency built into Macintosh from the start.

Colleagues from marketing, from publicity, from the executive suites — often people who normally loathed computers — would wander over and get a feel for this computer, try out the mouse and become seduced themselves. They would recommend that the company augment its desktop publishing Macintoshes with Macs devoted to more conventional applications.

"You would see the pattern," Brainerd recalls. "A large corporation would buy PageMaker and a couple of Macs to do the company newsletter. The next year you'd come back and there would be 30 Macintoshes. The year after that, 300."

The company belatedly arrived at a name for the process: the Trojan niche. It was as good a description as any for the way desktop publishing saved Macintosh's skin.

Levy is the author of *Hackers* and *Artificial Life* and has been a columnist at *MacWorld* since 1985. This is an excerpt from his book *Insanely Great: The Life and Times of the Macintosh, the Computer that Changed Everything*, which will be published by Viking this month. (Copyright 1994 Steven Levy.)

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EXPECT TO TAKE A MORE CORPORATEWIDE VIEW WHEN ADMINISTERING NETWARE 4.X

By Robert W. Harbison

Attention LAN administrators: If you're implementing and managing Novell, Inc.'s latest incarnation of NetWare, you need to be aware of a number of elements that were not required in previous versions.

While it is virtually impossible to cover every difference here, there a few major points that will help make your transition to NetWare 4.x easier.

NetWare 4.x has a global architectural design, unlike previous versions of the NetWare network operating system, which are based on a file server-centric architecture. For those versions, this means the file server is the center and single most important element of the LAN. Each server contains the total view of its resources in a file structure known as the bindery and is basically ignorant of other servers on the same or different LAN segments.

This server-centric architecture requires administrators to manually duplicate much of the information onto each file server's bindery. For instance, to connect to resources controlled by other servers, NetWare 3.x administrators must duplicate users' names and log-ins onto additional file servers.

On the other hand, NetWare Version 4.x employs a global database of network resources. Known as the NetWare Directory Service (NDS), this database allows file servers to be viewed as network resources in the same manner that printers, disks and communications resources are viewed. Users need only to log onto the NDS database to access any file server, printer or other defined resource.

A lot to know

The result is that the new breed of network administrators must understand the company's organizational structure, the physical networkwide configuration and the physical and logical relationship of resources, and they must have some knowledge of the communications channels between the resources' physical locations.

With users having enterprisewide capabilities, both communications and security will also become a daily task for the LAN administrator.

For instance, an understanding of communications comes in handy when assessing the impact of printing a report to a printer located across the country. Security issues will also continue to grow as users expand their reach beyond the file server-centric world.

Serious study will be required for NetWare Version 4.x's management tools, which pack more power than those in Version 3.x. The more difficult tools are those that give access rights to individual resources such as "Inherited Rights Filters," referred to as the "Inherited Rights Mask" in NetWare Version 3.0, and "Access Control Lists."

The biggest hurdle here is that there are more layers of trustee rights control to dig through when troubleshooting problems. Multiple log-in scripts at the organization and organizational unit levels, as well as additional user and profile log-ins, for instance, can cause very complicated log-in scripts and effective rights.

Harbison, owner of Network Integration Consultants in Sausalito, Calif., is an independent network consultant specializing in the design and implementation of LANs, wide-area networks and multiplatform connectivity.

NETWARE 3.X	NETWARE 4.X
Department-oriented	Enterprise-oriented
File server-centric	Network-centric
Flat bindery database	Relational directory database
One log-in per file server	Single networkwide log-in
Difficult to navigate network	Directory services browsing
Multiple administrative utilities	Consolidated utilities
No file system data migration	Supports file system data migration
250 users per file server	1,000 users per file server
8 concurrent server connections	54,000 concurrent server connections
File auditing not supported	File system and NDS event auditing
Does not support file compression	Supports individual file compression

Source: Network Integration Consultants, Sausalito, Calif.

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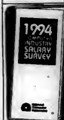

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WHAT MAINFRAMERS CAN TEACH YOU

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By David Baum

A common warning being broadcast to mainframe programmers is "Learn new skills or perish." Mainframe markets are turning soft, while client/server developers and PC network administrators are in high demand.

Despite this shift, there is plenty that PC people can learn from mainframers, particularly on the network front.

Mainframe programmers understand the importance of data integrity, validation and security, says Lloyd Bell, vice president of information systems at BankAmerica Corp. in Portland, Ore. "They have worked with robust network management tools and can apply those skills to the management of networks of PCs."

In fact, experts say there are three main areas to learn from:

NETWORK ADMINISTRATION

Many people maintaining LANs haven't been exposed to the methodical troubleshooting procedures used for the corporate network backbone in a mainframe setting, says Kent Failing, president of Computer Design Professionals in Atlanta. "In the mainframe world, there is usually just one network protocol, one vendor and one operating system," Failing says. "PC LANs, however, tend to have administrators at different locations interpreting things differently."

At one work site, Failing says, the corporate-level data was stored in an Oracle Corp. Oracle database on several Unix servers, and departmental data was maintained in a decentralized setting of about 50 PC LANs also running Oracle.

"All the log-ons and passwords between the departmental LANs and the corporate database got incredibly convoluted," Failing says. "And there was no central documentation describing the overall network configuration."

Problems arose when developers attempted to write programs that used networked resources. "Without organizational planning, there is often little rhyme or reason to how servers are named, what queues are available and so forth," Failing explains.

"It takes more effort and coordination to work in a decentralized setting, but it pays off when it comes to software distribution, maintenance chores and security efforts," says Greg Painter, project engineer at TRW, inc. in Ogden, Utah.

DATA ADMINISTRATION

Data backup and recovery gets tricky in a LAN environment because databases can exist on multiple servers with different backup regimens.

Failing's suggestion is to centralize the servers where they can be controlled by a professional systems administration staff. "If users want their own data backed up regularly, have them put it out on the server, or instruct them in the basics of data management on their own hard drives," he says.

Establishing corporate data models for client/server developers is also essential.

"This is overwhelming us," says Tom Runkle, the state of North Carolina's deputy state controller for information resource management. "We find it very difficult to coordinate data from many different departments and agencies."

Without a well-coordinated modeling effort, Runkle says, there might be 10 different customer databases in a single organization instead of just one.

Nigel Smith, a systems analyst at Shell Oil Co. in Houston, says one solution is to point users to a corporate repository where the integrated views of the business are defined rather than tell them they can't create their own databases.

Runkle agrees. "You can have the best technicians in the world for client/server — the best database designers, screen designers and LAN administrators — but if you don't get the data administration side taken care of, you'll never make it," he says.

SECURITY

Security and management tools needed to safeguard important information are more mature on mainframes and can be controlled by a single individual or small group. In a distributed LAN environment, however, sharing the resources often implies distributing access responsibility, which can lead to major security problems.

"Just because you decentralize the computers doesn't mean you decentralize all the security administration," says Cheryl Currid, president of Currid & Co., a consultancy in Houston.

Sensitive data should be maintained on systems with the best security mechanisms. A consistent method for user authorization and password assignments should also be set up, as should auditing mechanisms to track access to important network resources.

Baum is a free-lance writer in Santa Barbara, Calif.

6 LESSONS FROM THE GLASS HOUSE

- Establish lines of communication among the various PC LAN administrators.
- Devise standards for the way resources are named, applications are written and user authorizations are set up.
- Establish corporate security policies, keep sensitive data on the most secure platforms and consider restricting access to workstations through keys or identification cards.
- Document the overall network configuration, distribute it to all LAN managers and update it regularly.
- Enforce regular backup of all server data.
- Establish corporate data models to avoid redundancies in personal and departmental databases.

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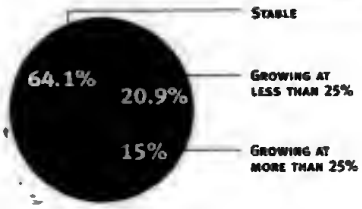

SURVEY BASE: 234 TECHNOLOGY FIRMS INVOLVED IN BIOTECHNOLOGY

SURVEY CONDUCTED BETWEEN AUGUST '93 AND SEPTEMBER '93; ASKED FOR HEAD-COUNT CHANGES DURING THE PAST YEAR

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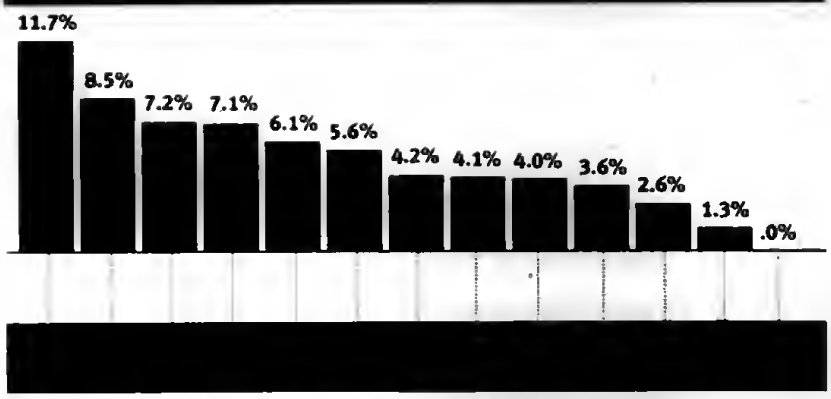

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BUYING ON-LINE SERVICES

Flat rates won't leave you flat out

By Joe Panepinto

The advice for companies looking for on-line information systems and electronic database services is simple — if you can get a flat rate, take it; if you can't, be careful.

According to Steve Sieck, an analyst at Link Resources Corp. in New York, information brokers are rapidly developing flat-rate, unlimited-use pricing schedules. This puts an end to crystal-ball forecasting by companies for on-line information demands.

Costs for these services are often difficult to predict because some include monthly and/or yearly service fees. Charges for on-line time can also vary by modem bit/sec. rates, read rates for viewing, downloading and printing, which vary according to the information source, and per-message-charges. Others, such as the Dow Jones News/Retrieval service, have different on-line and read rates for different times of the day.

"The whole market is in transition from [one that is] serving a dispersed number of specialized users in the library, marketing or legal department toward a more enterprise-based one," Sieck says. "Many of the players have been moving toward offering flat-rate options and volume discounts."

For example, ClariNet Communications Corp. in Cupertino, Calif., offers a flat rate for its ClariNews service, which includes wire service stories from United Press International and syndicated feature stories from other news gathering organizations, based on the number of users.

ClariNet delivers the information to an on-site server that can then be set up as an open-access news group. The price is $53 per month for a single user, but it rapidly declines on a user-based discounting schedule until it settles at roughly $1 per user for 1,000 users.

Flat-rate fees not only help an end-user organization plan budgets but can also prevent unexpected increases in on-line costs as users feel their way around unfamiliar systems. The Dow Jones News/Retrieval service suggests that companies that plan to use its services between 60 and 90 minutes per month during prime time (6 a.m. to 6 p.m.) should go with its corporate option: a $75 membership fee per account (up to five users per account) and a 33% discount on standard on-line charges.

Other on-line services have also adjusted their rate structures to meet the new demands of end-user companies. DataTimes in Oklahoma City offers flat-rate pricing packages for its on-line services of 121 newspapers and thousands of magazines and other sources, starting at $500 per month. For less frequent users, the normal usage-based pricing structure is still an option: a $75-per-month service fee plus 55 cents per minute to search a single source and a 76-cents-per-screen read/print/download fee.

PUSHY PAYS OFF

For companies that need more than worth of on-line services per month, it is worthwhile to try for a . Many on-line service providers simply don't advertise their flat-rate pricing schedules; however, many will negotiate one if you're insistent.

Targeting corporate users

The big consumer market providers of on-line services are also starting to target corporate users with special pricing. Companies can have up to five users for each America On-Line account ($9.95 per month, including five hours of free time and $3.50 for every hour over that).

CompuServe, which provides access to a number of IS support forums, offers business account rates. There is a $39.95 onetime setup fee ($25 of which is credited toward on-line charges) and a $10 per account monthly minimum. The price includes unlimited connect time and free access to some nonbasic services.

Panepinto is a free-lance writer in Amherst, Mass.

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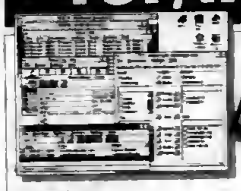

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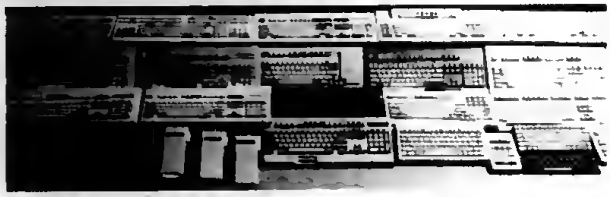

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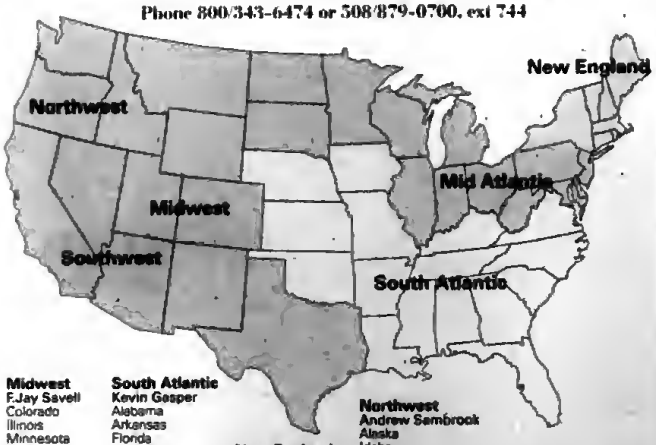

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Bids & Proposals

REQUEST FOR PROPOSALS

THE PORT AUTHORITY OF NY & NJ

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CONTRACT JFK-544.002
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This System will involve the following: The design, furnishing, and installation of a customized Taxi Request Station (TRS) at each Unit Terminal Building; the procurement and installation of ticket dispensers, vehicle detection loops, intercoms and a public address system; the design, development, testing and installation of custom computer software; specification, procurement, testing, and installation of computer hardware at the Central Taxi Hold facility; installation of a voice and data communications network; complete acceptance testing to include factory, field and operational tests; training and documentation of the complete System; a one year guarantee/warranty and the maintenance of all System components for two (2) years.

The Request for Proposals to be submitted to the Port Authority is set forth in the documents entitled, "The Port Authority of New York and New Jersey — John F. Kennedy International Airport — JFK Redevelopment Program — Request for Proposals — Central Taxi Hold Communication and Dispatch System — Contract #JFK-544 002 dated January 10, 1994. Sealed Proposals will be received on or before February 16, 1994. The Request for Proposals may be seen in Suite 5147 — 51st Floor and each set of Request for Proposal documents may be obtained upon receipt of a non-refundable payment of $25.00. Only company checks or money orders payable to the order of The Port Authority of New York and New Jersey will be accepted **(Please call (212) 435-7420 first for availability of the Request for Proposals).** If checks or money orders for documents are mailed, they should be addressed to The Port Authority of New York and New Jersey, One World Trade Center, Contract Desk — Suite 5147, New York, NY 10048. Questions by prospective proposers concerning the Request for Proposals should be directed only to William Odde at (212) 435-7429.

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"In a broad sense, our target audience includes anyone with a mainframe on the floor. More specifically, Faneuil Systems targets two categories of potential customers: organizations looking to outsource their corporate data centers while transitioning to smaller platforms - and companies needing outside services to drive their mainframe-based applications. In either case, *Computerworld's Marketplace Pages* put us in touch with organizations that have specific mainframe criteria and are a good fit for our environment.

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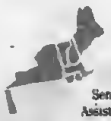

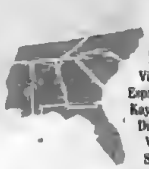

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Advertisers' Index

Ardis	15
Barnett Data Systems	44
BMC	96
Borland International	C4
Compaq Computer Corp.	18-19
Computer Associates	3, 20
Compuware	40
Conference Group	49
CW Ancillary	86
CW Classified	46, 48, 53, 54, 60, 61
CW Editorial Calendar	84
CW on CD	70
DB Expo	46
Dell	C3
Describe	10
Digital Equipment Corp.	42-43, 58-59
Elcom Technology	50
4th Dimension Software	13
General DataComm, Inc.	55
IBM	27, 28-29, 31, 34, 37, 39
Information Builders	9
Informix	25
Infovation Data Processing	7
Knowledgeware	21
Kyocera Electronics	48
Micro Focus	11
Micropolis	68
Microsoft	22-23, 45, 47, 88
Minolta	54
Oracle Corp.	5
Pennant Systems	70-71
Progress Software	64-65
SAS Institute	17, 66-67
SIM Technology Summit	73-75
Simware	24
Synoptics	60-61
Universal Data Systems	53
Windows World Open	76
XcelleNet	79

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions

Companies in this issue

Page number refers to page on which story begins

3Com Corp. 24

A

Aberdeen Group 27
Acorn Software, Inc. 62
Adobe Systems, Inc. 30,38
AGS Information Service 30
Alcom Corp. 1
American Airlines 69
American Lawyer Media 52
American Software, Inc. 14
Amoco Corp. 77
Andersen Consulting 60
Angoss Software Corp. 30
Anthem Electronics, Inc. 30
Apple Computer, Inc. 36,51,63,66,81
ARC Professional Services Group 30
Artisoft, Inc. 30
ASA International Ltd. 30
ASK Group, Inc. 57
AST Research, Inc. 6
AT&T 1,52
Attachmate Corp. 30
Austin Computer Resources, Inc. 38
Automatic Data Processing, Inc. 30,78
Automation Partners, Inc. 30
Avco 78

B

Banyan Systems, Inc. 1,51
Baylor College 41
Belden Wire & Cable Co. 1
Borland International, Inc. 6
Brio Technology, Inc. 67
Bristol Technology, Inc. 67
Brooktrout Technology, Inc. 67

C

Cabletron Systems, Inc. 24
Cadre Technologies, Inc. 67
Caere Corp. 38
Cleary Gottlieb Steen & Hamilton 1
Compaq Computer Corp. 6,44
Composites Automation Consortium 41
Computer Associates International, Inc. 14,27
Computer Sciences Corp. 30
Computervision 78
CompuWare Corp. 14
Conner Peripherals, Inc. 41
Consensys Corp. 63
Control Data Systems, Inc. 52
Coopers & Lybrand 4
Corex Technologies Corp. 38
Cyrix Corp. 24

D

DataEase International, Inc. 30
Dataquest, Inc. 6
Datech Network Systems, Inc. 1
Delrina Corp. 44
Digital Communications Associates, Inc. 54
Digital Equipment Corp. 7,49
Digital Technologies International 57
Digitalk, Inc. 67
Dominion Textile, Inc. 16
Dragon Systems, Inc. 30

E

Eagle Technology 30
Eastman Kodak Co. 35
Electronic Data Systems Corp. 14
Electronic Mail & Micro Systems 1
EMS Professional Shareware 67
Epoch Systems, Inc. 60
Ernst & Young's New Age Architectures Group 60
Ethicon, Inc. 78

F

Federal National Mortgage Association 78
Ferris Networks, Inc. 44
ForeFront Group, Inc. 41
Forrester Research, Inc. 35
Fortis Benefits Insurance Co. 27
Freeman Associates, Inc. 41
Frontier Software Development, Inc. 52

G

Gartner Group, Inc. 6,7
Gasteiger & Deloons 4
Gateway 2000, Inc. 36
General Electric Co. 52
General Motors Corp. 57,69
Goldman, Sachs & Co. 52

H

Hewlett-Packard Co. 1,6,36,44,51,69
Hughes Enterprise Information Systems 66
Hughes LAN Systems, Inc. 52
Horwitz Consulting Group, Inc. 7

I

IBM 14,16,35,36,44,49,51,63,69
IBM PC Co. 36
ICI 49
Incotel, Inc. 1
Information Architects, Inc. 63
Informix Software, Inc. 30
Insight Research Corp. 52
Intel Corp. 38
Intergraph Corp. 49
InterGroup Technologies, Inc. 35
Intermetrics 78
International Computer Facsimile Association 1
International Data Corp. 1,36

J

J. R. Simplot Co. 7
JetForm Corp. 44
Johnson & Johnson 52,78

K

KEA Systems Ltd. 30
Keane, Inc. 30
Kidder, Peabody & Co. 14
KPMG Peat Marwick 78
Kraft General Foods 52

L

Leading Market Technologies, Inc. 36
Legato Corp. 1
Legato Systems, Inc. 41,60
Legent Corp. 27,60
Link Resources Corp. 1
Looking Glass Software, Inc. 38
Lotus Development Corp. 1,6,27,30,35,41,44

M

Manzanita Software 38
Massachosetts Financial Services 16
McCarter & English 52
McCormack & Dodge 6
MCI Communications Corp. 52
Merck & Co. 52
Merrill Lynch Global Securities 14
Meta Group, Inc. 66
Metropolitan Life Insurance Co. 78
Micro Focus Publishing 67
Microsoft Corp. 1,4,6,14,27,30,35,36,38,41,44,54,60,63,67
Minolta Corp. 14
Montgomery County 24
Morgan Stanley & Co. 36
Motorola, Inc. 36,52,63

N

National Car Rental Systems, Inc. 14
National Computer Systems 78
NCR Corp. 44,51
Networth, Inc. 24
Next Computer, Inc. 81
Northeast Consulting Resources, Inc. 51
Novell, Inc. 1,6,24,51,63
Nynex Corp. 62
Nynex Worldwide Services Group, Inc. 30

O

Object Design, Inc. 57
Ocean Isle Software, Inc. 38
Open Software Foundation 51
Optical Data Systems, Inc. 54
Oracle Corp. 30,60,63
Osteonics Corp. 6

P

Pacific Bell 66,69
Palindrome Corp. 41
ParePlace Systems, Inc. 66
Paws, Inc. 7
Pepsico, Inc. 1
PKS Information Systems 14
Platinum Software Corp. 38
Poet Software Corp. 38
Progress Software, Inc. 30
PushButton Software, Inc. 38

R

R. M. Fichera Associates 66
Radio Shack 30
Reach Networks, Inc. 52
Recognition International, Inc. 78
Reliability Ratings, Inc. 16
Renaissance Technology Corp. 57
Rice University 41
River Downs 6

S

SAK Consulting 38
Sapienos International Corp. 49
Scientific Programming Enterprise 38
Sequent Computer Systems, Inc. 44
Siemens Medical Systems, Inc. 4
Silicon Graphics, Inc. 6
Solt-Switch, Inc. 1
Software AG of North America, Inc. 27
Software Research 67
Southwestern Bell Telephone Co. 41
Storage Technology Corp. 52
Sugarman Brothers 78
Summit Strategies, Inc. 44
SunConnect 51
Sun Microsystems Computer Corp. 44
Sun Microsystems, Inc. 1,36,38,49,51,57,67
Sybase, Inc. 57,60,78
Symantec Corp. 30
Symbiotics, Inc. 63
Synernetics, Inc. 54
SynOptics Communications, Inc. 24

T

Taligent, Inc. 63
Tennessee Valley Authority 60
Teubner & Associates 1
Texaco, Inc. 1
The Root Group, Inc. 54
The Santa Cruz Operation 1
Tivoli Systems, Inc. 60
Trifox, Inc. 30
TriStar Market Data, Inc. 30
Turner Corp. 1

U

Unify Corp. 6
Union Pacific 69
University of Colorado 78
University of Michigan 51
University of Texas' M.D. Anderson Cancer Center 6
Unix System Laboratories, Inc. 6

V

Versant Object Technology Corp. 57
Visa International 1
VisiSoft, Inc. 60
Volkswagen GmbH 57

W

Wellfleet Communications, Inc. 52
WordPerfect Corp. 44,63
Workgroup Productivity Corp. 49
WorkGroup Technologies, Inc. 24,44
Wyse Technology, Inc. 6

X

Xerox Corp. 63

Z

Zebra Express 38
Zenith Data Systems 24

Note: Due to technical difficulties, the Index is incomplete.

Gainers Losers

Percent

Camber Corp.	36.4	Struct. Dynamics Research	20.6
Data Switch Corp.	25.9	TriCord Systems	-12.9
Group I Software	21.9	Informix Corp.	-12.8
Commodore Int'l	20.8	Gandalf Technologies Inc.	-12.5
Western Digital Corp.	20.8	Symantec Corp.	-11.7
Legent Corp.	20.4	Platinum Software	-11.4
Zeos International Ltd.	20.0	4th Dimension	-10.4
Adobe Systems Inc.	19.1	Southwestern Bell Corp.	8.8

Dollar

Newbridge Networks Corp.	6.25	Motorola Inc.	-4.75
BMC Software Inc.	5.00	Bell Atlantic Corp.	-4.38
Legent Corp.	4.63	Southwestern Bell Corp.	-2.75
DSC Communications	4.38	Tandy Corp. (H)	5.75
Progress Software Corp.	4.38	Struct. Dynamics Research	2.50
Adobe Systems Inc.	4.25	AMERITECH Corp.	-3.50
CrossComm (L)	3.88	TriCord Systems	-3.38
Wellfleet Communications (H)	3.50	Platinum Software	-2.88

The regional Bell operating companies took it on the chin last week when MCI Communications Corp. announced plans to break into local phone service.

[redacted]

Continued success

A few tech stocks have managed stellar performances for two years running.

EMC Corp. (EMC), for example, has been a model of consisteocy. The Hopkintoo, Mass., storage manufacturer pumped its share value up by 180% in 1993 — almost exactly like the previous year. **DSC Communications Corp.** (DIGI) and **Newbridge Networks Corp.** (NNXCF) were even more spectacular io their two-year gains. Each hiked up roughly 170% io 1993, after rising more than 400% in 1992.

On the flip side, development software maker **Easel Corp.** shed about 65% of its price in 1992 and matched that in 1993.

And then there are the turnarounds. **Sequent Computer Systems, Inc.** (SQNT) gained 85% in 1993 after losing that amount in 1992. **Dell Computer Corp.** (DELL) weot in the other directioo: After appreciating 180% in 1992, the PC company fell 53% last year.

—Derek Slater

Top performers

Company name	Price 12/31/92	Price 12/30/93	Change in 1993
[illegible]	[illegible]	[illegible]	43.00
Motorola Inc.	52.25	91.88	39.63
[illegible]	[illegible]	[illegible]	[illegible]
Lotus Development Corp.	19.63	56.00	36.37
[illegible]	[illegible]	[illegible]	34.50
Micrage Inc.	8.00	39.25	31.25
[illegible]	[illegible]	[illegible]	[illegible]
Micron Technology	18.88	46.25	27.37
[illegible]	[illegible]	[illegible]	[illegible]
Compaq Computer Corp.	48.75	74.50	25.75
[illegible]	[illegible]	[illegible]	[illegible]
Centigram Communications Corp.	12.75	35.38	22.63
[illegible]	[illegible]	[illegible]	21.50
Xilinx	25.25	46.25	21.00
[illegible]	72.00	[illegible]	[illegible]
Reynolds and Reynolds	24.38	44.50	20.12
[illegible]	[illegible]	[illegible]	[illegible]
Computer Sciences Corp.	78.25	97.13	18.88
[illegible]	[illegible]	[illegible]	[illegible]
EMC Corp.	5.94	16.88	10.94

EMC's 1992 price is adjusted to reflect a subsequent stock split.

Exch	52-Week Range			Jan. 7 noon	Wk Net Change	Wk Pct Change
Communications and Network Services						UP 2.11%
OTC	49.88	19.63	3 COM Corp. (H)	45.88	2.25	4.7
NYS	91.15	71.00	AMERITECH Corp.	71.88	-3.50	-4.5
NYS	65.00	50.75	AT&T	54.11	1.13	2.1
OTC	4.44	1.72	Artel Communication Corp.	3.44	0.00	0.0
OTC	26.50	12.50	Banyan Systems Inc.	16.75	0.00	0.0
NYS	69.13	49.25	Bell Atlantic Corp.	50.13	-4.38	-7.2
NYS	63.88	50.63	BellSouth Corp.	55.05	-2.75	-4.2
NYS	14.75	4.25	Bolt, Beranek & Newman	13.75	1.50	12.2
OTC	16.50	9.50	Brooktrout Technology	15.25	1.25	8.9
NYS	119.00	26.50	Cabletron Systems	114.75	1.88	1.7
OTC	36.50	11.25	CentigRam Communications	36.00	-1.00	2.0
OTC	55.50	25.50	Chipcom Corp.	49.75	-0.25	-0.5
OTC	66.11	38.50	Cisco Systems Inc. (H)	66.13	0.75	2.1
OTC	19.38	8.00	Compression Labs Inc.	12.13	-0.15	1.0
OTC	36.00	20.00	CrossComm (L)	24.38	1.88	18.9
OTC	4.65	2.50	Data Switch Corp.	2.12	0.44	25.9
OTC	11.50	3.31	Digital Systems Int'l Inc.	3.75	0.25	2.1
OTC	73.13	20.88	DSC Communications	66.25	4.38	2.1
OTC	9.50	4.25	Fibronics Int'l Inc. (L)	4.61	0.13	2.8
OTC	4.38	2.12	Gandalf Technologies Inc.	2.61	-0.38	-12.5
OTC	2.06	0.69	Gateway Communications	0.94	0.00	0.0
NYS	15.75	6.50	General DataComm Inds	10.00	0.12	1.3
ASE	3.50	2.00	Go Video	2.94	0.25	9.3
NYS	39.88	33.88	GTE Corp. (L)	34.63	-0.50	-1.4
NYS	94.88	69.00	ITT Corp.	90.38	2.12	-2.3
OTC	29.88	18.81	MCI Communications Corp.	27.75	2.25	-4.3
OTC	6.13	1.50	Microcom Inc.	5.50	0.25	4.8
OTC	24.25	3.50	Netrix Corp.	5.00	0.00	0.0
OTC	19.06	6.25	Network Computing Devices	8.00	1.25	18.5
NYS	11.50	5.50	Network Equipment Tech.	8.75	-0.13	1.4
OTC	20.15	8.00	Network General	17.38	-0.50	2.8
OTC	15.25	6.88	Network Systems Corp.	9.00	0.50	5.9
OTC	23.88	20.19	Newbridge Networks Corp.	62.13	6.25	11.2
NYS	46.00	21.38	Northern Telecom Ltd.	32.61	1.00	3.2
OTC	35.75	17.00	Novell Inc.	21.50	0.88	4.2
NYS	48.88	39.50	Nynex Corp. (L)	39.50	-1.38	-3.4
OTC	30.00	19.00	Octel Communications Corp.	28.25	0.63	2.3
OTC	6.50	3.75	Penril Data Comm Networks	5.88	0.19	5.1
OTC	38.50	24.50	PictureTel Corp.	27.25	-1.50	-8.0
OTC	11.50	3.62	Proteon Inc.	6.25	0.38	6.4
NYS	38.88	17.75	Scientific Atlanta Inc.	34.63	2.00	6.1
NYS	47.00	34.19	Southwestern Bell Corp.	39.00	3.75	8.8
NYS	40.25	25.63	Sprint Corp.	32.88	-2.13	-6.1
OTC	26.75	12.50	Standard Microsystems Corp.	21.12	-0.25	-1.2
OTC	19.75	10.26	Stratacom Inc.	16.25	-0.38	2.9
OTC	42.75	20.00	Synoptics Communications	30.75	2.75	9.8
OTC	9.88	2.88	Telebit Corp.	7.88	0.50	6.8
OTC	35.25	17.00	US Robotics	32.50	-2.25	-6.5
NYS	50.75	37.88	US West Inc.	61.88	2.50	5.4
OTC	68.00	29.50	Wellfleet Communications (H)	68.00	3.50	5.4
OTC	19.50	7.75	Xircom	18.75	1.75	10.3
PCs and Workstations						UP 5.74%
OTC	5.56	2.50	Advanced Logic Research	3.63	0.25	7.4
OTC	65.25	32.00	Apple Computer Inc.	31.88	2.13	7.1
OTC	95.50	12.75	AST Research Inc.	23.50	1.00	4.4
NYS	7.63	2.50	Commodore Int'l	3.63	0.63	20.8
NYS	76.98	41.75	Compaq Computer Corp.	76.98	2.38	3.2
OTC	49.88	13.50	Dell Computer Corp.	25.25	2.25	8.8
NYS	89.25	64.38	Hewlett-Packard Co.	81.38	2.63	3.3
NYS	24.75	11.75	Silicon Graphics (H)	23.50	-1.25	-5.2
OTC	61.00	21.13	Sun Microsystems Inc.	29.75	-0.11	-0.4
NYS	50.75	24.63	Tandy Corp. (H)	46.00	-3.75	-7.5
OTC	7.00	2.50	Zeos International Ltd.	3.75	0.62	20.0
Large Systems						UP 3.24%
ASE	6.50	4.38	Amdahl Corp.	6.88	0.75	12.2
NYS	8.75	3.63	Convex Computer	5.50	0.13	2.3
OTC	5.13	1.88	Cray Computer	2.75	0.38	15.8
NYS	30.88	20.38	Cray Research Inc.	26.50	0.50	1.9
NYS	13.88	7.75	Data General Corp.	9.75	0.50	5.4
NYS	49.25	32.75	Digital Equipment Corp.	36.75	2.38	6.9
NYS	47.38	32.88	Harris Corp.	45.00	-0.50	-1.1
NYS	59.88	40.65	IBM	58.25	1.50	2.4
OTC	26.75	5.25	Kendall Square Research	6.63	-0.62	10.4
NYS	141.50	107.00	Matsushita Electronics	137.25	2.25	1.7
OTC	25.75	12.75	NetFrame	17.00	0.00	0.0
OTC	26.00	9.25	Parallan Computer	11.50	-0.75	-6.1
OTC	22.25	11.25	Pyramid Technology	14.75	0.50	3.5
OTC	24.00	11.25	Sequent Computer Sys	15.88	0.63	4.1
OTC	6.00	1.63	Sequoia Systems Inc.	4.00	-0.13	-3.0
NYS	61.25	30.25	Stratus Computer Inc.	30.75	-0.50	1.6
NYS	16.88	8.50	Tandem Computers Inc.	11.38	0.25	2.2
OTC	00.00	10.63	TriCord Systems	22.75	3.38	12.9
NYS	13.88	9.88	Unisys Corp.	12.63	0.25	-1.9
Software						UP 2.87%
OTC	37.00	16.25	Adobe Systems Inc.	26.50	4.25	19.1
OTC	27.50	12.25	Aldus Corp. (H)	25.00	-1.75	-6.5
OTC	9.33	5.13	American Software Inc.	6.38	0.50	8.5
OTC	20.13	9.00	ASK Computer Systems	12.12	-0.88	-6.7
OTC	56.75	37.00	Autodesk Inc.	45.50	-0.25	-0.5
OTC	5.25	2.38	Bachman Info. Systems	3.00	0.00	0.0
OTC	42.00	24.00	BGS Systems Inc.	28.75	2.00	7.4
OTC	84.15	34.75	BMC Software Inc.	53.00	5.00	10.4
OTC	28.25	20.38	Boole & Babbage	23.50	-0.50	2.9
OTC	27.75	12.75	Borland Int'l Inc.	15.25	0.38	2.5
OTC	4.65	2.75	CE Software	3.25	0.00	0.0
ASE	40.75	16.41	Cheyenne Software Inc.	28.88	1.50	5.5
OTC	11.13	6.00	Cognos Inc. (H)	10.50	0.50	-4.5
NYS	44.25	20.38	Computer Associates	42.38	1.88	4.6
NYS	6.50	2.73	Computervision Corp.	3.88	0.25	6.9
OTC	34.25	19.25	Compuware Corp.	25.00	-0.25	1.0
OTC	13.25	5.75	Comshare Inc.	30.50	0.50	5.0
OTC	21.38	5.38	Corel Corp. (H)	20.38	0.88	4.5
OTC	14.50	1.38	Easel Corp.	4.75	0.38	8.6
OTC	23.00	8.75	FileNet Corp.	20.50	-2.50	-6.8
OTC	25.75	25.75	4th Dimension	21.50	2.50	-10.4
OTC	19.25	5.25	Frame Technology	10.00	1.38	15.9
OTC	17.00	2.00	Group 1 Software	9.75	1.75	21.9
OTC	35.25	23.50	Gupta	10.75	0.63	3.4
OTC	12.00	5.88	Hogan Systems Inc.	9.00	1.00	12.5
OTC	27.75	21.25	HNRS	26.25	1.38	5.5
OTC	44.75	27.00	Information Resources	16.88	-1.25	5.9
OTC	27.25	13.38	Informix Corp.	18.75	-2.75	-12.8
OTC	23.50	8.50	Intergraph Corp.	10.25	-0.13	1.2
OTC	13.63	4.88	Interleaf Inc.	7.00	-0.63	-8.2
OTC	15.00	4.75	Intersolv Inc.	12.50	-0.25	2.0
OTC	18.75	2.75	KnowledgeWare Inc.	15.88	0.88	5.8
OTC	54.75	15.50	Legent Corp.	27.25	4.63	20.4
OTC	58.75	19.00	Lotus Development	57.50	2.50	4.5
OTC	23.00	4.25	MathSoft	6.88	0.12	2.0
OTC	20.25	4.50	McAfee Associates	8.00	0.25	3.2
OTC	11.63	4.38	Mela Software	6.38	0.00	0.0
OTC	15.50	7.88	Mentor Graphics	13.50	-0.75	1.8
OTC	46.00	15.13	Micro Focus	25.38	0.75	5.1
OTC	13.75	4.38	Micrografx Inc.	9.12	0.13	1.4
OTC	88.00	70.38	Microsoft Corp.	83.25	2.63	3.3
OTC	37.75	13.31	Oracle Corp.	32.13	3.12	10.8
OTC	44.75	22.50	Parametric Technology	39.50	0.88	2.3
OTC	40.50	23.50	PeopleSoft	32.12	1.00	3.2
OTC	7.13	3.50	Phoenix Technologies	4.19	0.19	4.7
OTC	45.25	22.00	Powersoft	39.88	-1.63	2.9
OTC	29.75	13.50	Platinum Software	22.38	2.88	-11.4
OTC	25.00	2.75	Platinum Technology	11.25	0.38	3.4
OTC	60.25	37.25	Progress Software Corp.	47.19	4.38	10.2
OTC	4.50	1.94	Quarterdeck Office Sys	2.56	0.38	17.1
OTC	22.00	16.00	Rainbow Technologies Inc.	19.25	0.75	4.1
OTC	11.38	4.25	Rasterops	7.38	0.20	1.3
OTC	15.25	5.75	Ross Systems (L)	6.50	0.00	0.0
OTC	28.75	17.50	Sapiens Int'l Corp. N.V. (L)	10.25	2.25	6.6
OTC	14.50	5.50	Software Publishing Corp.	7.88	0.75	5.3
OTC	17.25	6.38	Software Toolworks Inc.	10.38	0.13	1.2
OTC	2.88	0.75	Spinnaker Software	2.12	0.28	15.3
OTC	13.75	6.25	State of the Art	7.00	-0.50	-6.7
NYS	33.63	17.63	Sterling Software Inc.	30.50	2.13	7.5
OTC	21.63	11.50	Struct. Dynamics Research	11.50	3.50	20.6
OTC	44.50	22.75	Sybase Inc.	44.50	2.50	6.0
OTC	20.50	9.25	Symantec Corp.	16.00	2.13	11.2
OTC	24.25	10.00	System Software Assoc.	14.63	-1.10	-7.1
OTC	6.50	3.88	Timberline Corp.	3.94	0.06	1.3
OTC	26.50	22.50	ViewLogic Systems	31.00	1.00	-4.5
OTC	18.25	5.50	Walker Interactive Systems	22.88	1.75	10.0
OTC	2.19	0.84	WordStar	3.38	0.72	18.9
Semiconductors						UP 1.28%
NYS	32.88	17.00	Advanced Micro Devices	17.88	1.13	-4.2
NYS	28.00	15.50	Analog Devices Inc.	24.61	0.00	0.0
OTC	38.63	15.50	Atmel Corp.	38.75	2.63	7.7
OTC	6.88	2.75	Chips and Technologies	6.88	0.38	5.8
OTC	39.75	13.00	Cirrus Logic	38.38	1.75	4.8
NYS	16.75	9.38	Cypress Semiconductor Corp.	14.13	0.38	2.7
NYS	29.00	11.75	Dallas Semiconductor	15.88	0.63	4.1
OTC	24.50	42.75	Intel Corp.	61.38	0.50	0.8
NYS	29.25	10.75	LSI Logic Corp.	16.19	0.25	1.6
OTC	26.75	12.75	Lattice Semiconductor	15.88	-0.50	3.1
NYS	63.01	19.75	Micron Technology	50.50	3.38	2.2
NYS	107.50	68.75	Motorola Inc.	88.75	-4.75	-5.2
NYS	21.75	10.13	National Semiconductor	17.25	1.75	7.8
OTC	14.50	6.50	Sierra Semiconductor	7.75	0.00	0.0
OTC	52.75	25.75	SynOptics	45.50	0.50	1.1
NYS	84.25	50.50	Texas Instruments	67.00	2.75	4.3
OTC	18.88	6.50	VLSI Technology	13.00	0.43	1.1
OTC	14.38	6.13	Weitek	9.00	0.50	5.9
ASE	10.88	3.63	Western Digital Corp.	20.88	1.88	20.8
OTC	54.50	23.50	Xilinx	47.13	-0.63	-1.3
OTC	40.75	19.00	Zilog Inc.	33.00	2.00	6.7
Peripherals and Subsystems						UP 4.09%
OTC	24.75	18.50	American Power Conversion	22.25	1.25	5.3
OTC	24.25	25.50	Banctec Inc. (H)	23.38	-0.13	-0.5
OTC	15.25	3.50	Camber Corp.	5.50	1.67	36.4
ASE	18.38	3.88	Countronics Corp.	4.38	0.13	2.9
NYS	25.50	9.00	Conner Peripherals	15.63	1.00	6.8
OTC	38.50	17.50	Creative Technologies Inc.	35.25	3.50	11.0
OTC	50.75	6.50	Data Race Inc.	10.00	1.00	21.1
ASE	12.50	7.50	Dataram Corp.	8.63	0.25	2.8
NYS	19.50	5.15	EMC Corp.	18.38	1.88	11.4
OTC	30.00	5.25	Emulex Corp.	6.63	0.62	10.4
OTC	20.00	14.00	Evans & Sutherland	18.75	0.00	0.0
OTC	16.88	7.50	Exabyte	18.88	1.25	7.1
OTC	34.00	17.50	Intelligent Info. Systems	24.88	-1.00	4.0
OTC	9.25	2.38	Iomega Corp.	3.00	0.44	22.1
OTC	11.50	5.75	IPL Systems Inc.	8.75	0.38	4.5
OTC	24.00	13.75	Komag Inc.	17.00	-0.65	-3.5
OTC	15.00	4.38	Maxtor Corp.	6.13	0.63	11.4
OTC	9.88	5.75	Micropolis Corp.	6.50	-0.50	-7.1
NYS	117.00	97.25	3M Corp.	107.75	-2.25	1.1
OTC	9.00	4.00	Printronix Inc. (H)	8.75	0.25	2.9
NYS	27.25	7.50	QMS Inc.	9.75	0.63	6.8
OTC	17.88	8.38	Quantum Corp.	16.00	1.50	10.3
OTC	9.15	3.13	Radius Inc.	7.81	0.19	2.5
NYS	17.75	11.75	Recognition Equipment	14.00	-0.88	-5.9
OTC	9.00	3.65	Rexon Inc.	5.75	0.50	9.5
OTC	25.63	13.13	Seagate Technology	25.63	2.00	8.5
NYS	65.00	16.00	Storage Technology	30.88	-0.75	-2.4
NYS	27.88	21.00	Tektronix Inc.	25.00	1.25	5.3
NYS	90.13	69.88	Xerox Corp.	80.13	0.38	0.4
Services						UP 0.10%
NYS	4.38	1.75	Allerion Inc.	4.00	0.11	4.2
OTC	23.75	14.88	American Mgmt. Systems	18.75	1.00	5.1
NYS	4.63	2.38	Anacomp Inc.	3.88	0.00	0.0
OTC	23.84	15.00	Analysts Int'l	18.00	0.50	3.9
NYS	56.88	46.88	Auto Data Processing	53.25	-2.88	-5.1
NYS	19.88	23.00	Ceridian Corp.	19.38	0.50	2.6
NYS	21.00	23.13	Comdisco Inc.	20.13	0.88	4.5
OTC	13.38	6.16	Computer Horizons	12.00	0.00	0.0
NYS	100.25	70.00	Computer Sciences	98.13	-1.07	-1.6
NYS	9.00	6.00	Computer Task Group	7.00	0.00	0.0
NYS	27.00	17.88	CompUSA Inc.	16.38	1.50	7.9
OTC	14.12	8.75	Control Data Systems Inc.	9.63	-0.15	-1.9
OTC	16.00	7.00	Corporate Software	14.00	-0.28	-0.9
OTC	11.13	6.62	Egghead Discount Software	9.25	0.26	2.8
NYS	35.88	26.00	General Motors E (EDS)	30.63	-0.63	2.1
OTC	25.50	12.75	Inacom Corp.	25.00	1.50	11.1
OTC	28.00	12.00	Intelligent Electronics (H)	25.75	1.63	5.0
OTC	18.50	9.75	Medstat	18.13	0.00	0.0
OTC	42.25	7.00	Micrage Inc.	42.25	3.50	9.0
OTC	37.75	22.50	Paychex	31.50	2.50	7.2
NYS	87.25	21.63	Policy Management Sys.	29.38	-1.25	5.6
NYS	65.88	26.75	Reynolds and Reynolds (H)	43.25	2.25	-4.9
OTC	27.25	13.38	SEI Corp. (H)	27.00	0.75	2.9
OTC	26.00	17.50	Shared Medical Systems	83.00	1.25	5.0
OTC	12.63	6.38	SHL Systemhouse	7.38	0.38	5.4
OTC	30.75	20.00	Software Spectrum Inc.	22.75	0.75	3.4
OTC	42.75	28.00	Sungard Data Systems	38.50	-2.25	-5.5

Key: (H) = New annual high reached in period (L) = New annual low reached in period

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Wysiwyg

What was your MOST embarrassing moment involving a computer?

"When my secretary accidentally attached a major reorganization memo to another announcement that went to all 800 employees worldwide. The reorganization memo was a draft I was experimenting with and was not ready for release for at least a month." **—Rick Crandall, CEO/President, Comshare, Inc.**

"When I proposed to my wife at a Major League Baseball game over the computerized scoreboard. Her name was spelled wrong."

—Mark Lambright, President Lucid Corp.

"My most embarrassing moment was when I joined Madge and downloaded E-mail, then required Information Services to learn how to read the messages."

—Marc Jones, President Madge Networks, Inc.

ILLUSTRATIONS BY PHIL MARDEN

The 5th Wave *by* Rich Tennant

Inside Lines

Settlement confirmed?

Faced with the unsettling prospect of publicly hanging out their laundry, the feuding members of the erstwhile $125 million Confirm reservation project were close to settling their acrimonious differences out of court last week. In fact, AMR said it settled with Marriott early last month and had recently reached agreement with Hilton Hotels and Budget Rent A Car. All three settlements involve undisclosed payments by AMR, Confirm's developer, to the travel industry partners, sources said. The travel partners alleged that AMR covered up technical problems long before they surfaced. Budget sought $100 million, and Marriott sought $64 million. AMR had claimed the partners had withheld funds and made poor staffing assignments.

Turnin' up the volume

Sun is expected to jump into this winter's round of low-end workstation announcements with a powered-up SPARCclassic LX workstation and an enhanced SPARC 10 Unix server (see story page 6). Industry analysts said they believe Sun will double the LX's performance with a microSPARC II chip running in the range of 60 to 80 MHz; a new SPARC 10 will host a SuperSPARC chip running at 60 to 70 MHz. But before that, Sun may come out with a "fast" twisted-pair Ethernet controller said to support up to 100M bit/sec. — just as fast as fiber-optic cable. The option will support high-bandwidth multimedia and video applications without forcing sites to rewire with fiber, analysts said.

Copycats

IBM is apparently joining its sibling rivals Novell and Banyan (see story page 1) in the great migration of network operating systems onto RISC-based Unix platforms. IBM is expected today to announce intentions to put its LAN Server on AIX. While the OS/2-based LAN Server did not have the resource capacity problems NetWare is having on DOS, IBM will be responding to a growing user clamor for the range and depth of network cards, programming tools and the like to be found on the so-called "open" Unix platforms.

CD-ROM wasn't built in a day

Novell's CD-ROM NetWare Loadable Module (NLM) is apparently not all it's cracked up to be and then some, according to two user sources. One source said the CD-ROM NLM is prone to "stupid problems, like the operating system tries to write to the CD." The other user said loading software on a variety of server hardware configurations "causes server utilization to go to 100%; then the server rolls over and dies." A Novell source said the company is aware of, and will repair at an undisclosed time, some "admittedly annoying cosmetic flaws" that may be responsible for the first user's problems. Novell has not heard of any "huge problems" such as server crashes, the insider said.

Unisys users unite

Unisys user group members of Use, Inc. (former Sperry Corp. users) and Cube (former Burroughs Corp. users) overwhelmingly approved the merger of the two organizations into a single U.S. Unisys user group, called Unite. The first official Unite conference will be held this April in Nashville.

Sources at Apple say astronomer Carl Sagan was so upset that Apple engineers had used his moniker as the code name for a 66-MHz PowerPC in development that he called up the Cupertino, Calif., company and gave them an earful. Ever the gentlemen (and women), the techies backed down. The new name of the project, BHA, stands for Butt-Head Astronomer. Sagan, as well as code names Cold Fusion and PDM, were originally chosen by Apple engineers, who consider them the three biggest hoaxes of all time (PDM stands for Piltdown Man, trumpeted as the oldest human remains when found), according to an engineer who recently left Apple. Phone, fax or CompuServe News Editor Alan Alper with news tips at (800) 343-6474, (508) 875-8931 or 76537,2413, respectively. Or try Computerworld's *24-hour voice-mail tip line at (508) 820-8555.*

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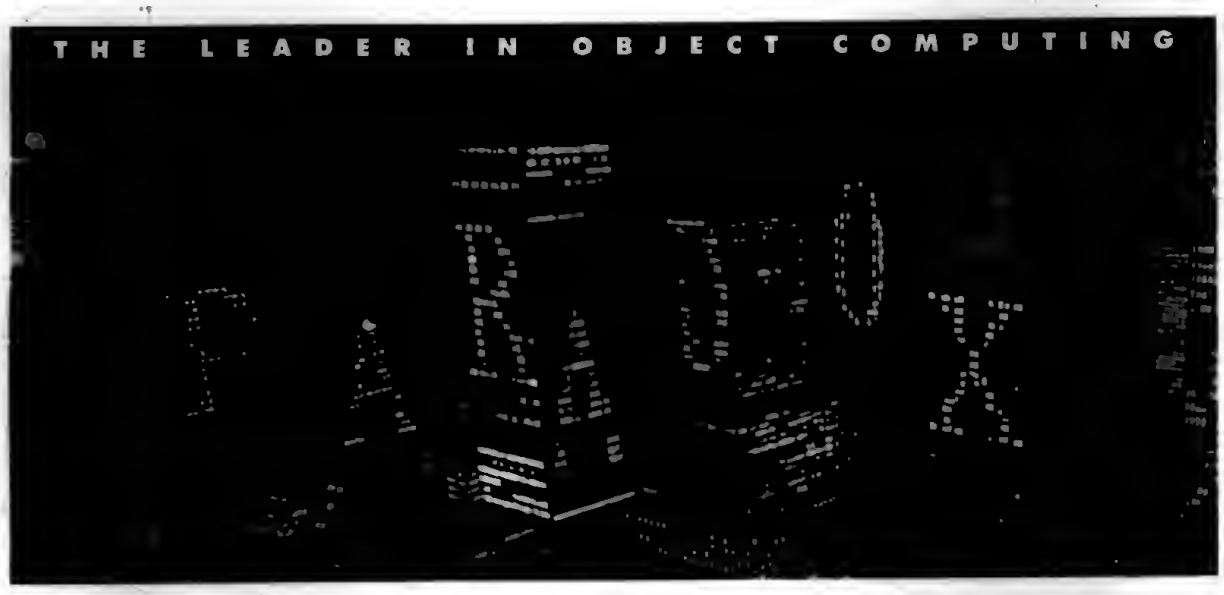

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